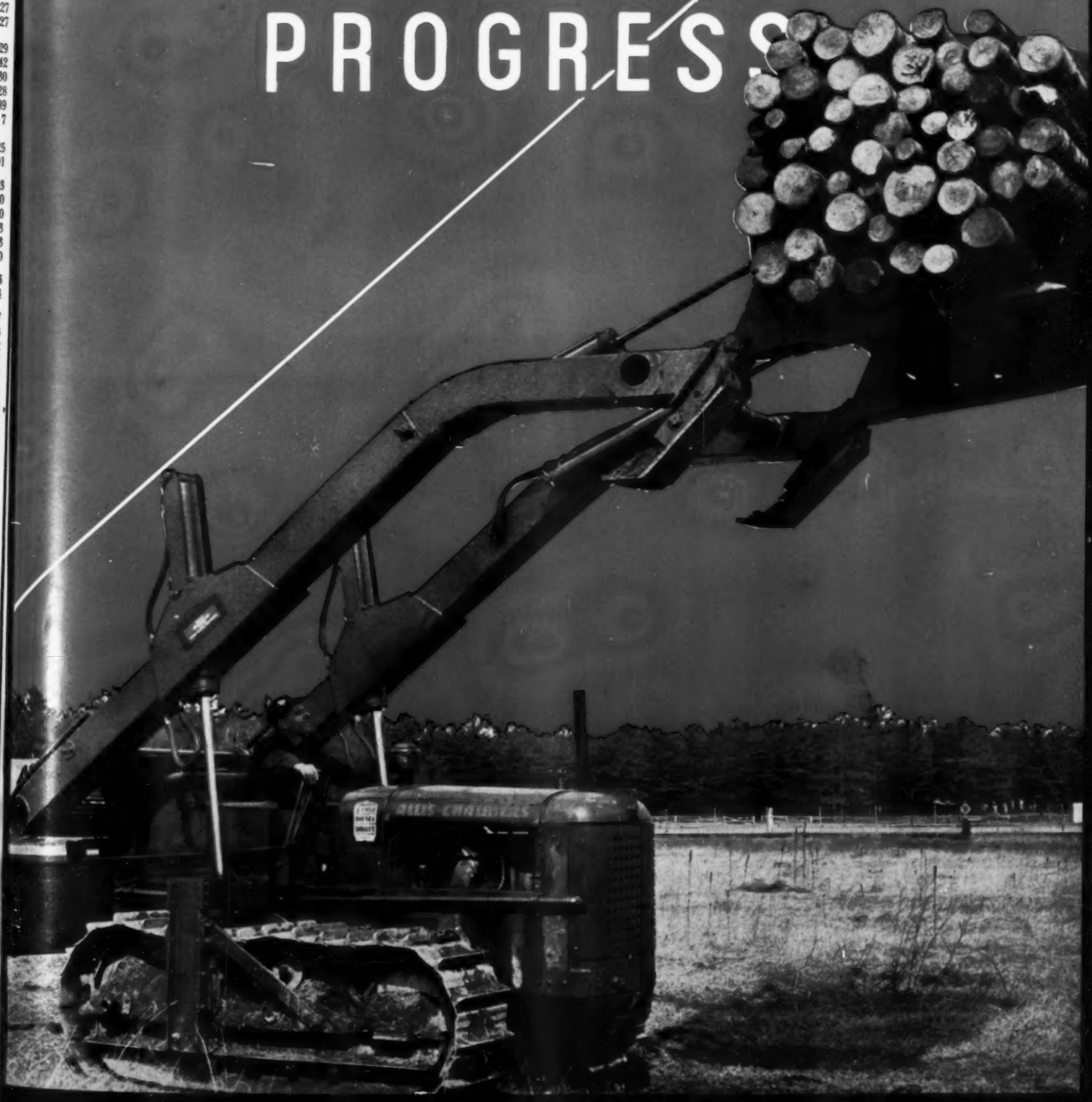
DIESEL PROGRESS



JULY, 1945

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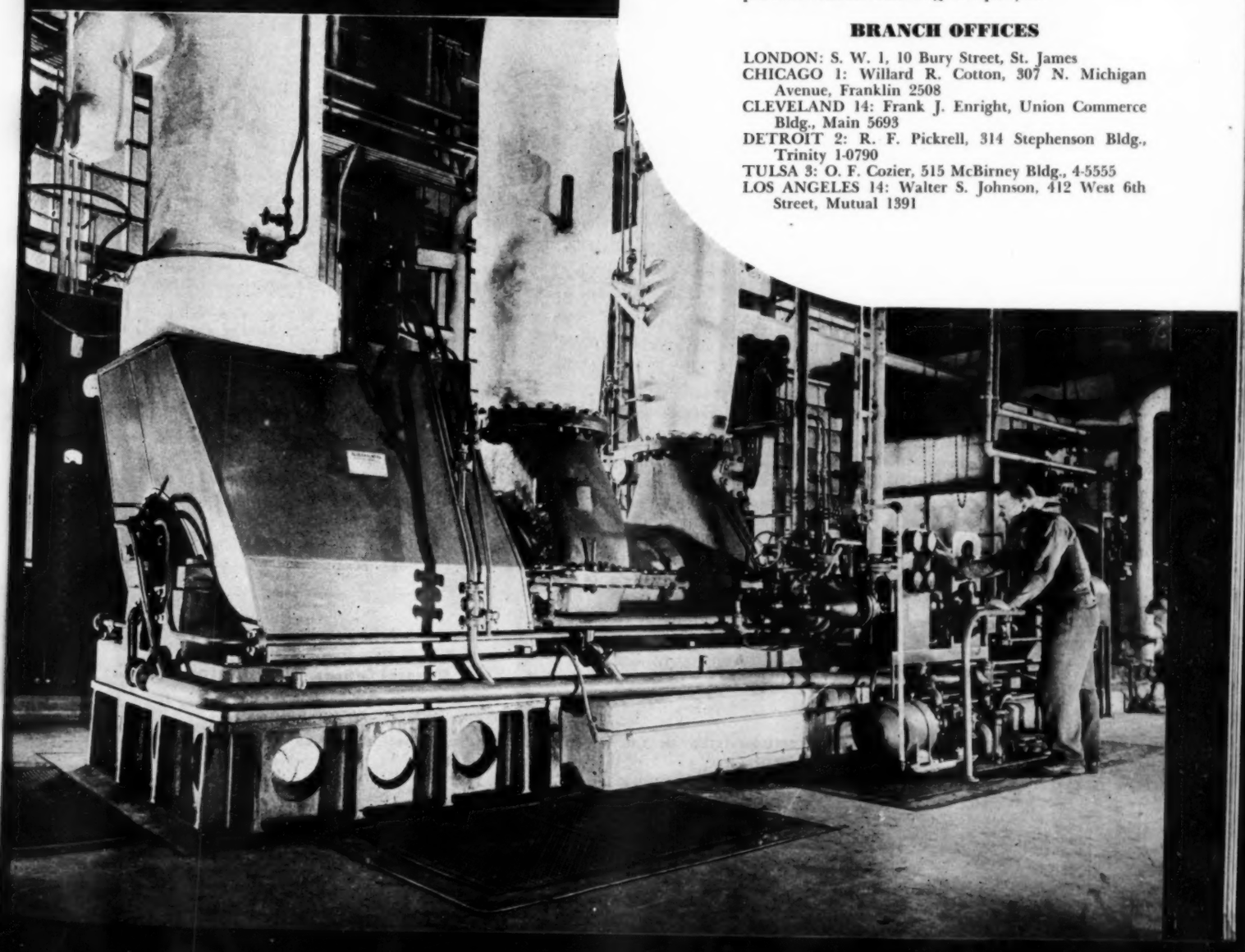

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Night view showing brilliant lighting effect on the modern plant of Nylen Products.

MODERN PLANT

Uses Diesel Waste Heat

By GEORGE D. CROSSLEY

AN economic crime is committed when heat from a Diesel engine is thrown away—if any possible use exists for this heat. When operating at full load, a two-cycle pump-scavenging Diesel with oil-cooled pistons transmutes 32.7 per cent of fuel energy into useful work on the crankshaft. The rest is heat. 34.7 per cent leaves the manifold in exhaust gases; 18.5 per cent is drawn off in the cooling water and 7.5 per cent by the oil-cooling system; 6.6 per cent dissipates as direct radiation and unaccounted loss.

Many Diesel applications are unable to utilize any part of this power-generation bi-product. It may be that the need for heat is not timed with the need for power—or there may be no need for heat at all. If there is a use for it, however, which is in reasonable relationship to the amount generated, it is sound economy to put this throw-away heat to work.

Conditions are right for the recovery of heat from Diesel operations at the St. Joseph plant of the Nylen Products Company. The efficient manner in which this Michigan manufacturer has harnessed the waste heat from his Diesel power plant is worthy of careful observation. "Nylen Products" are new and replacement pistons for refrigeration compressors and gasoline engines—plus machine tools and other metal parts which require accurate machine work and adherence to the demand for close tolerance manufacture. They are built in an ultra-modern plant which is operated by the power of three Fairbanks-Morse Diesels and heated by utilization of the bi-product recovered from the same three engines.

The first Diesel was bought eight years ago, and it continues to deliver its 120 hp. through six 24-hour days of each week. A 225 hp. Diesel was added in 1941, and its duplicate was put in operation slightly less than a year ago. A fourth engine, rated at 300 hp., has been purchased and is soon to be installed.

The two 225 hp. Diesels are three-cylinder units with 14-in. bore and 17-in. stroke. They operate at 300 rpm., and are direct-connected to 148 kw. generators of 80 per cent power factor. The smaller and oldest Diesel is a two-cylinder unit with 12-in. bore and 15-in. stroke. Its operating speed is 360 rpm., and its generator, also direct-connected, is rated at 75 kw. Generated energy is three-phase 450-volt, and V-belt-driven exciters are respectively 7½ kw., 7½ kw. and 5 kw. Engine and engine room accessories include Burgess and Maxim exhaust silencers; Burgess intake silencer-filters; Honan-Crane lube purifier; Woodward governors; Walworth and Crane valves, and Fairbanks-Morse evaporative cooler.

All three Diesels are used during the day, while the 120 hp. unit and one or the other of the 225's work the night shifts. Normal operation is at about 90 per cent of full load. All engines are idle from midnight Saturday night to midnight Sunday night, and this period is ample for the regular functions of maintenance.

Electric motors, ovens and lighting constitute the major load. 160 kw. of resistance-type ovens are in present use, and the installation of as many more is contemplated. Since one oven—a 96 kw. unit—is on and off at frequent intervals, there is considerable load fluctuation.

Power factor averages about 85 per cent. To an original total of 60 kva. in capacitors, an equal amount has recently been added.

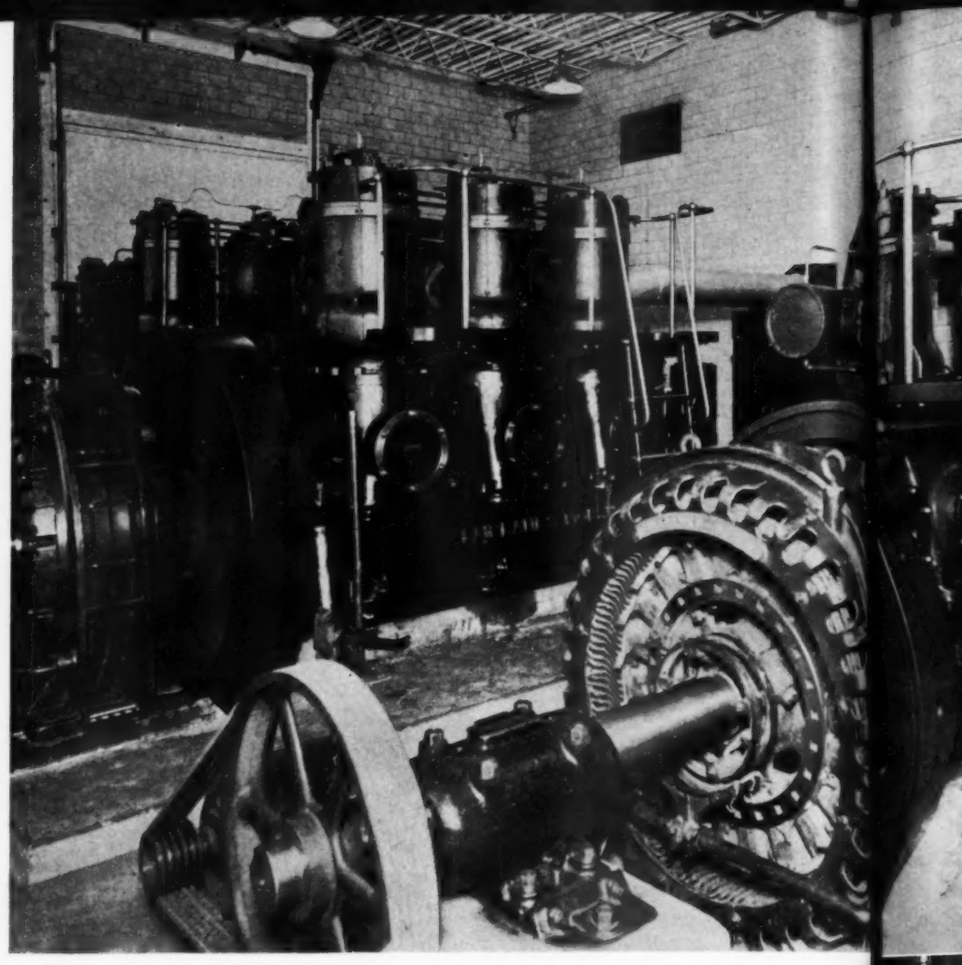
"In spite of the exacting demands made on the Diesels," says Chief Electrician Carl Story, "interruptions in service have been infrequent. The power plant gets only about two and a half hours of supervision each day. Wartime operating conditions have caused some variation in costs, but the plant normally produces its power for six mills per kilowatt hour."

Nylen Products Company heats a main machine shop of 60-foot by 200-foot dimensions. The calculated requirement to bring an outside temperature of minus ten degrees (all temperatures in Fahrenheit) to a room temperature of 60 degrees is 1,616,000 Btu. per hour. About 160 kw. of the generated electric power are used in this shop, and radiation from this volume of motors, lights and ovens contributes approximately 547,000 Btu. per hour toward solving the problem of space heating.

Running at full load, the 120 hp. and one of the two 225 hp. Diesels discard into the jacket water 643,000 Btu's of heat per hour. Since no less than this combination of engines is running twenty-four hours a day, this amount of heat is always available from the Diesels. The total heat from radiation and engines is 1,190,000 Btu per hour—enough to provide adequate heat for the shop when outside temperatures do not dip below the plus 8.5 degree level. For the rare emergency of extremely cold weather and for the 24-hour period of week-end shut-down, two small oil-fired boilers take over the heating load. Their operation is thermostatically controlled.

Water leaves the Diesel jackets at 140 degrees. To cool it and to supply heat to the machine shop, two banks of four Fairbanks-Morse unit heaters are installed at ceiling level in the shop. Their capacity is rated at 740,000 Btu per hour with 140-degree water and 100-degree air entering the units and a water circulation of 175 gallons per minute. The eight unit heaters have more than adequate capacity to cool the engines in summer—and there is an equal factor of safety over the space heating needs of winter.

Each unit heater has louver dampers operated by a damper motor and controlled by a room thermostat. Below a working temperature of 65 degrees, the air from the room is circulated past the coils and back into the room. At higher temperatures, the air is exhausted through ducts in the roof. The volume of air handled by the unit heaters totals about 32,000 cubic feet per minute—an average of one complete air change each ten minutes.



Engine room view showing the three F-M Diesels now supplying power and heat for this plant. A fourth F-M Diesel is now being installed.

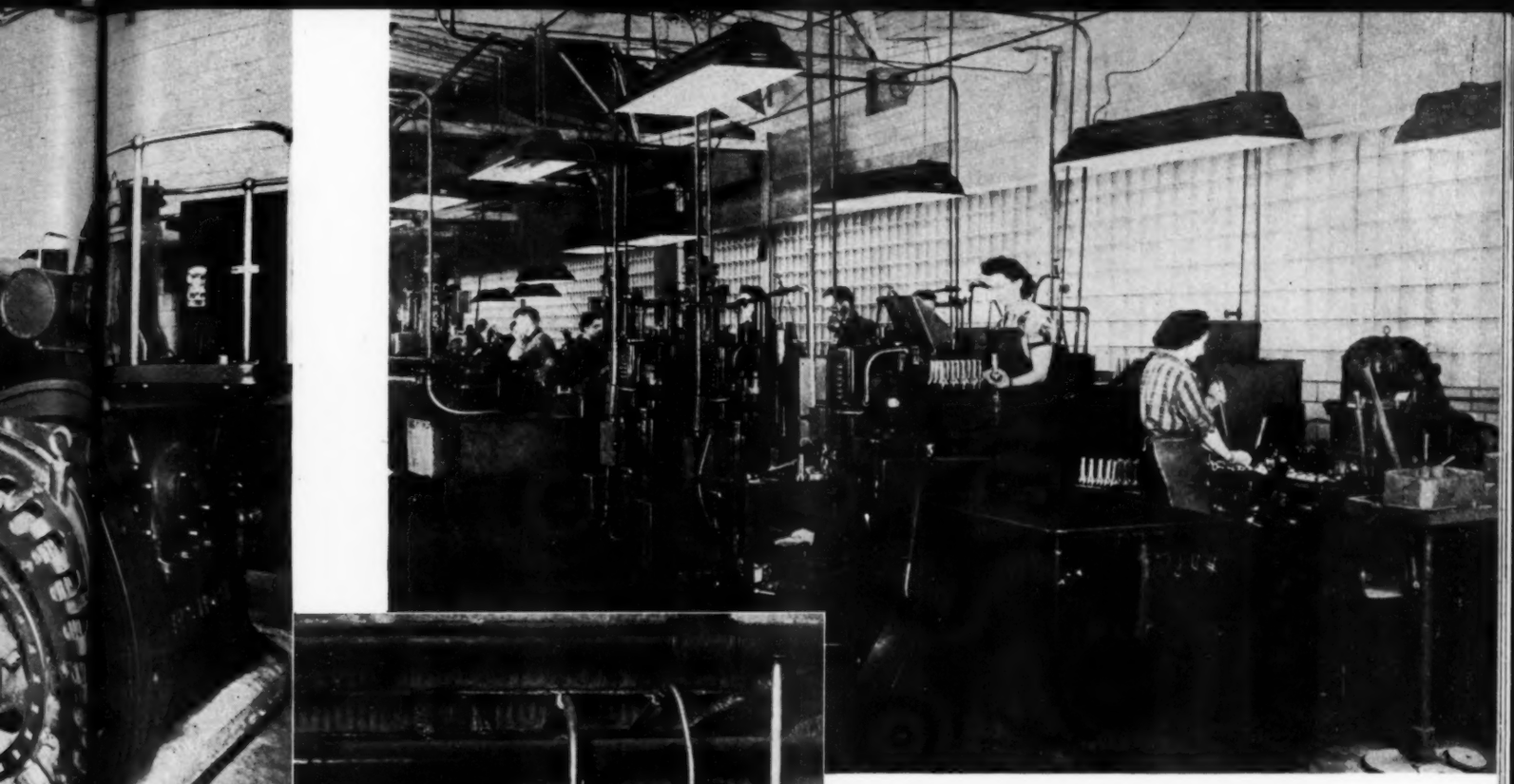
Manually operated louvers located close to ceiling level along the walls admit outside air to compensate for exhaustion through the heater ducts. These louvers are usually open—even in sub-zero weather—for the available heat from the jacket water is more than ample.

Temperatures of the circulating water are maintained so the difference between inlet and outlet reading is a matter of ten degrees. Three centrifugal pumps, driven by 5 hp., 3 hp. and 2 hp. motors, regulate the circulatory flow, and are so connected that any pump can be used on any engine—or on a header. Water for cooling, as well as for general plant use, is obtained from a six-in. well. Its six-stage centrifugal pump is driven by a 7½ hp. motor. Jacket water is softened before use.

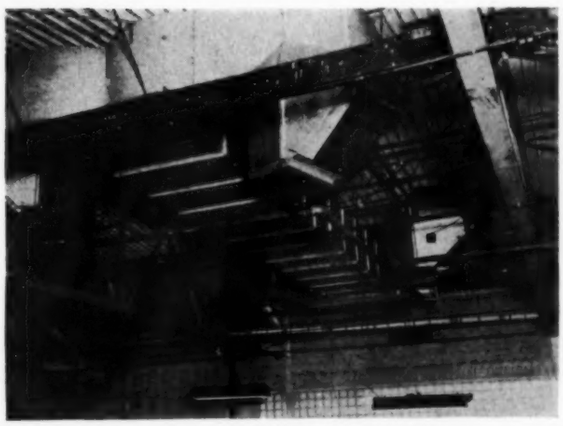
The engineering department and general offices on the ground floor of the two story section of the new building are air-conditioned. The stockroom, located in a separate wing of the building is served by an evaporative-type heater that at the present time is operated dry.

No exact record has been maintained on the fuel consumption of the auxilary oil-fired boiler. It is estimated, however, that shop heat demand for one season would have used about 33,000 gallons of oil if unaided by the recovered heat from the Diesels—and that the auxiliary boilers actually used 2,000 gallons through this same period. This is a saving of 31,000 gallons—a saving at five cents a gallon of $1,550.00.

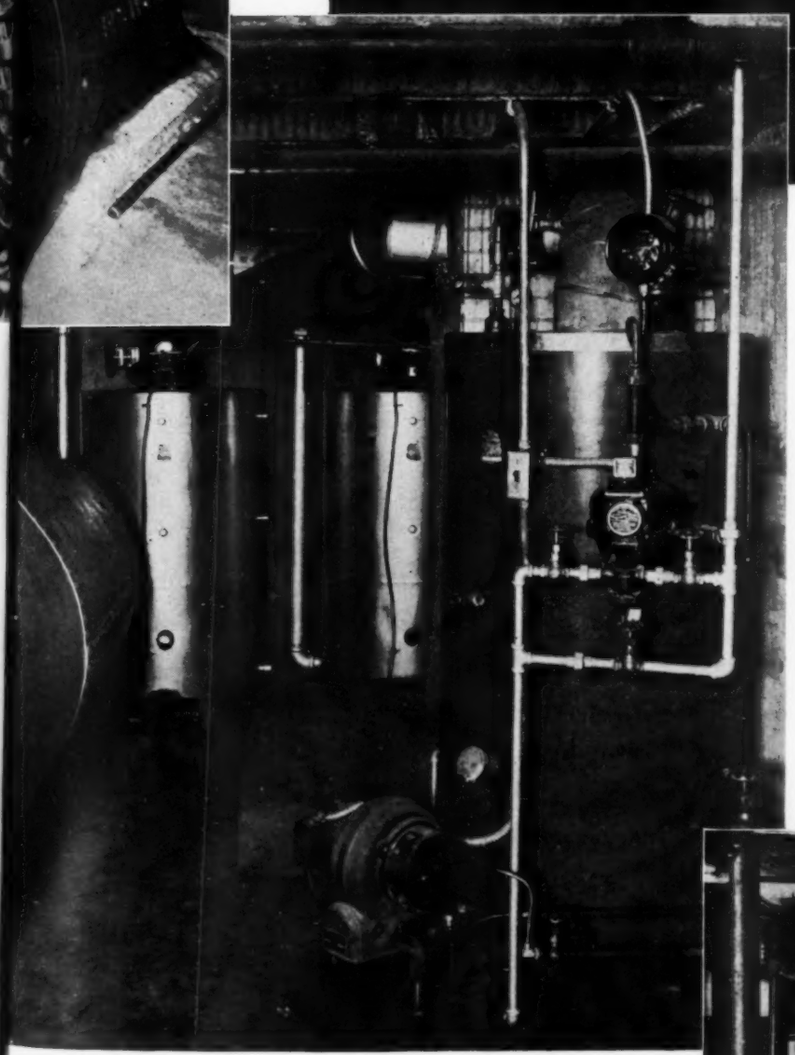
Nylen's heat recovery equipment and its installation cost about $1800.00 more than the simplest type of heat-wasting equipment necessary to Diesel operation would have cost. This investment paid for itself in slightly more than its first year of operation, and is now earning a healthy eighty-six per cent on its net worth.



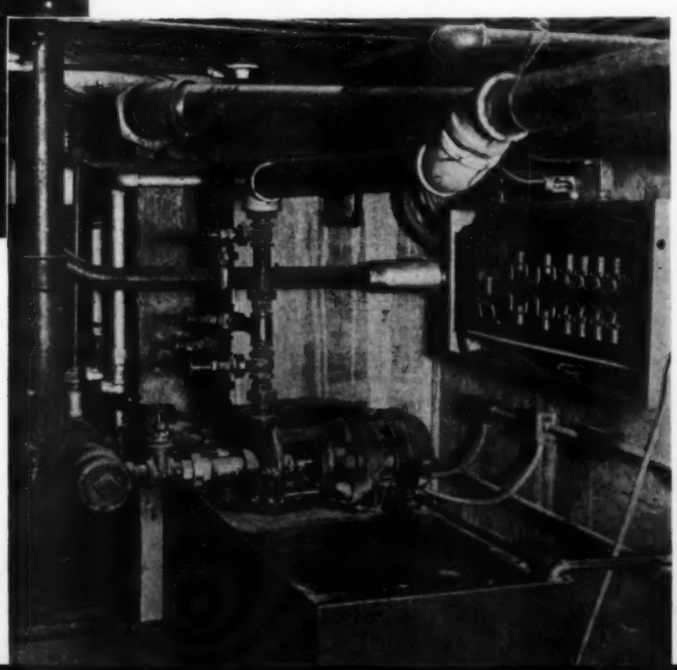
A section of the Nylen Products machine shop. Note orderly arrangement and ample lighting.



Ceiling view in the machine shop showing F-M unit heaters which are supplied with hot water from the Diesels.



View showing oil-fired auxiliary service hot water heaters automatically controlled in series with the circulating pumps.



F-M built together engine cooling water circulating and heating system circulating pumps.

DIESELS N D

Caterpillar Diesel tractor cultivating a date garden in Coachella Valley, California.

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SELS DEFENSIVE IN FOOD DEBACLE

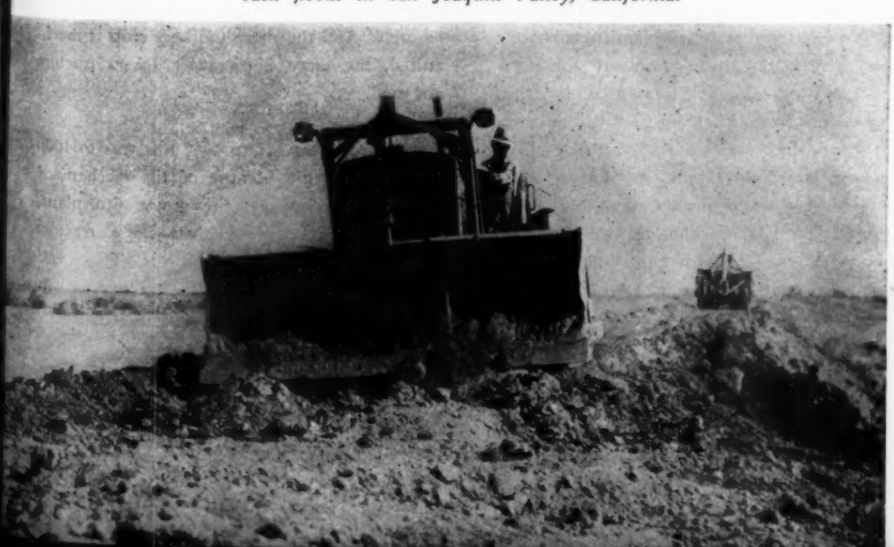
On West Coast Big Crawler Tractors and Trucks Are Battling to Save Farm Production Program After Government Blunders Have Hobbled Grower

By F. HAL HIGGINS

WAR is ending with a hungry world looking to the United States to feed it for a year until a crop can be grown to make each nation independent in feeding its population. But, instead of an abundance of meats, fats, sugar, beans, potatoes, eggs, milk, butter, cheese, fruits and vegetables and other standard food products we planned to have in abundance against the day when war ceased, we are ourselves running short of most of these standard items. It's no fault of the farmer, either. He has done more with less manpower than ever before in his history of war production. But he has been hobbled, hamstrung and bedeviled by Government red tape and Bureau personalities who not only did not know the U. S. farming system and how it worked, but worse yet, they were the kind of political theorists who did not know they didn't know!

In all previous U. S. wars, the farmer still held the balance of power as regards his importance in the elections. Hence, he was rated by his government important in any war effort. With the population continually shifting from farm towns to industrial centers over the past century as agriculture mechanized, however, this balance of power has finally gone to the cities. In the last election, for example, every city over 50,000 population voted for the Fourth Term and opposite to the vote of the farm areas and small towns dependent upon the farm trading for their existence. So, agriculture no longer controls national elections, and its voice in Washington asking for tractors and farm machines to step up farm production to top efficiency was not heard. Today the farm machine is both obsolete and worn out. That means a great deal of the tractor-wise skilled farm labor and management wastes a larger per cent of its priceless time than normally in trying to repair machines that should have been replaced in the first two years of the war to give Agriculture a new and highly efficient set of tools to permit labor to not only keep going every minute of the working day, but also to throw into the fields and orchards an extra shift or two to tractor-farm around the clock when weather and crops demand it to get every pound of food produced.

Diesel tractors with graders push up dikes to hold back floods in San Joaquin Valley, California.



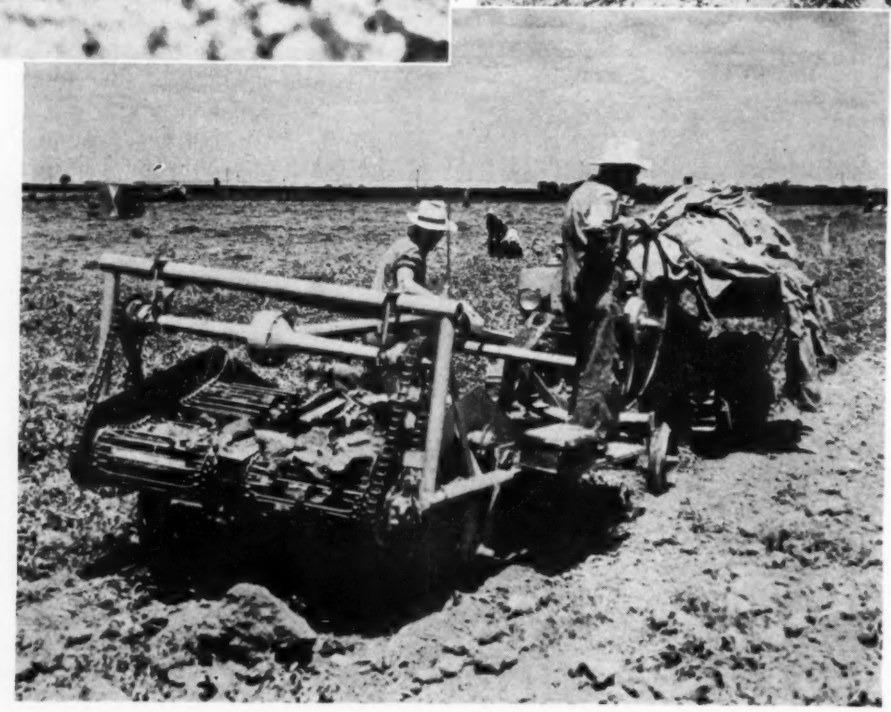
No farming area in the world feels this ignorant handling—almost criminal negligence—as much as does the highly tractorized agriculture of the Pacific Coast and Arizona. Here much of the farming is year-round, 365 days of the year, with several crops being grown on the same fields with "programmed" farming of special crops for high yields in the vegetable areas. That calls for almost factory production schedules to keep the farm going like a great food factory. Planting and harvesting is going on all the time in such areas as the Imperial and Salt River valleys of California and Arizona. Any field failures of tractors stop the job and throw the schedule off with disastrous results all along the way.

Beginning with the arrival of the Diesel tractors in California and Oregon in 1932 the best farmers in orchard, field and grove have Dieselized as fast as they could get tractors and engines for plowing, disking, harvesting, irrigation pumping, trucks, etc. Many crop areas like grain, rice, beans, sugar beets, potatoes, prunes, oranges, alfalfa, lettuce, flax, etc., are as near completely mechanized as it was practical at the time war broke in 1939. Those farsighted growers who plan ahead all the time and had available cash and credit, stepped up their plans for buying new Diesel tractors and were ready for three years of war when the Bureaucrats stepped in and stopped farmer purchase of Diesel tractors and engines. That half of power progress also slowed new machine ideas. They have been doing their best, but this is six years of war now, and it is time to add new tractors—lots of them; maybe 100,000 to this California-Arizona area alone. They could still get a lot of food produced before the hungry of the world all get to eating regularly again.

Senator Ben Hulse, one of the noted authorities on tractor farming in the most famous food producing area in the world—the Imperial Valley—estimates that the farmers of that area could have been producing one-third more the past three years had they been allowed to farm with all the new equipment and fertilizer they needed to carry out their highly efficient "programmed farming." The writer's estimate of the Imperial, as well as the Salt River and Yuma valleys of Arizona, as well as for other

Four wheel drive truck, powered with Hercules Diesel loading in the field to speed movement of crops and cut labor 40%.

This International Diesel tractor is hauling a sugar beet harvester in Salinas Valley, California.



Diesel tractor with digger harvesting early potato crop near Shaffer, California.

areas in Oregon, Washington, Idaho and California is that his estimate is not far off. Yet, the farmer has not laid down or quit. He has been talking to himself frequently after his arguments for more farm tractors and tractor-powered farm machines has been brushed off at Washington or at such subsidiary Government spots as San Francisco, Phoenix, Portland, Seattle and other key points in the Government war set-up. Occasionally he has taken precious time and gasoline to drive to such spots and has come away with a new appreciation of the sentiment of General Sherman as regards war. The swarms of female and male payroll riders he has noted on the elevators to and from coffee shops in the giant buildings housing Governmental war agencies has him wondering whether his enemy is in the Orient or in Washington and its state subsidiaries.

The California labor situation is a paradox as war in Europe ended this spring and the Pacific war steps up to its climax. Unskilled labor in the Imperial Valley is so plentiful that the labor rates set by the Government for sugar beet field work is lower there than in other areas of the state farther north. "It's the laxity of Government check-up on Wet-Back Mexicans," explained the County Advisor and farm tractor dealers when questioned on this seeming queer farm labor situation. "Skilled farm labor is still scarce down here, but unskilled labor is so plentiful the wage rate is dropping here compared with areas farther from the border." As a consequence, the old style stoop labor in sugar beet production is still with this area while beets grown in the Salinas, San Joaquin and Sacramento valleys are being mechanized as rapidly as possible to eliminate all stoop labor of these unskilled foreign-born laborers. And the more the beet crop is mechanized, the more big crawler Diesel tractors are used.

Sugar beet acreage is up 40% this year to 100,000 in California because of the mechanized program that permits the growers to plant, thin and harvest by machines—Diesel tractors for practically all the big growers. There will be over 150 of the "Mar-Beet" harvesters in the California beet fields this fall, an extra 80

being built this year for work next fall. These 2-row jobs require a real crawler power tractor about D-6 or HD 14, TD 9 to TD 12. The single-row harvester can be handled by a TD 9 nicely, though D4's are a bit light in heavy soil. Wheat is down and barley up in acreage for 1945 compared with 1944. Oats and flax are also down in favor of more alfalfa for pasture, hay and nitrogen storage in the soil. The rice crop is fully up to the record acreage of 1944 –possibly a bit of an increase.

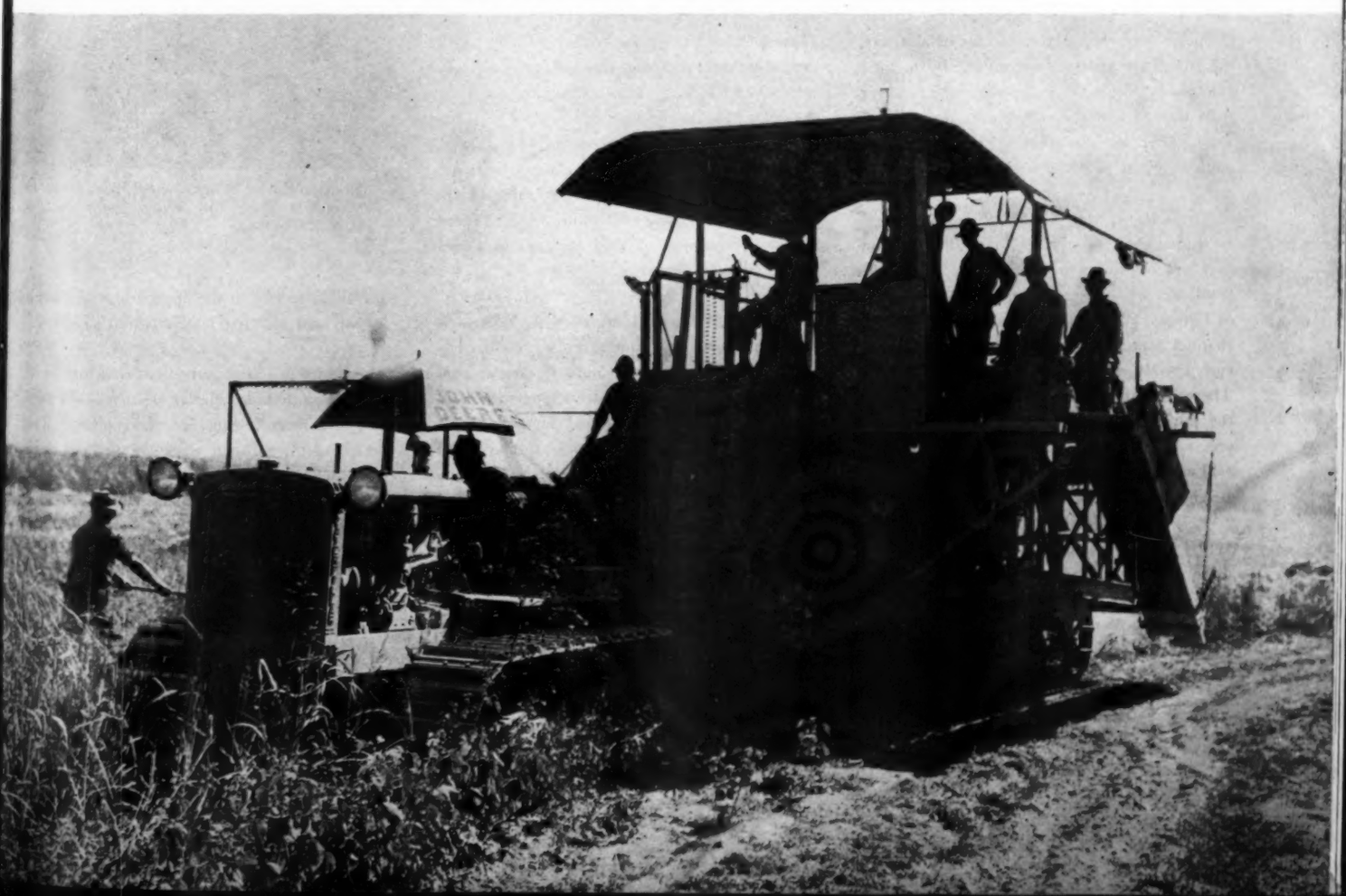
In the important fruit and nut crops of California, the Diesel tractor has also been doing the heavy duty jobs. Besides pulling the heavy duty disk harrows for cultivation and chopping in the cover crop and pulling the irrigation furrowers, the heavy tractors have proved great labor savers in shaking off prune and almond crops at harvest time. This California tractor job has now been perfected by University of California engineers until the man on the tractor can do the job without a second man to climb trees to hook up and unhitch belts at the end of cables. The new technique has a rod with a hook for grabbing tree limbs as the tractor is steered up under a tree and the desired limb is hooked by the tractor driver. He then backs the tractor to tighten the hook and starts the tractor shaking of the nuts or fruit. Several hundred tractors are so used each fall now, and the heavy Diesels are the best.

Peaches, pears, apricots, grapes, walnuts, cherries are all on the Diesel tractor crop lists for wartime efficiency. A lot of big trees have been rooted out to be replaced by grain crops and small trees that can be picked from the ground instead of from ladders. Labor under wartime conditions has become so fussy about how much money it can make per day at picking tree fruits that it won't waste time climbing trees for $10-a-day wages at piece work when it can triple that by picking heavy bearing trees from the ground. Hence a swing to dwarf trees, say plant and fruit breeders at the University.

In the citrus groves—orange, lemon, grapefruit and lime—all are making money for their owners who have Diesel tractors to power their cultivation, spraying and harvesting. Your Old Reporter ran across a Government purchase story in the Imperial Valley the other day that sheds light on some things that have been happening in the food industry under political war handling: A grapefruit grove owner sold his 40 acre crop on the trees for $18,000. The buyer turned and sold the crop to a second buyer for $26,000. The second buyer then sold the same crop—still on the trees—for $46,000 to the Government! Talk about "messing with Mr. In-Between"!

Floors of dealers and branches are empty of tractors as meat, poultry, sugar, eggs, milk, and even beans get scarcer and disappear from the consumer's view. The dealers' repair shops are crowded with old obsolete and worn out tractors dating back to pre-World War I as farmers try to take up the power slack and get their work done with dwindling skilled labor that is further handicapped by wasteful machines that fail on the job and require more valuable time than ever for repair and patching. The European war has collapsed and fighting armies are being shifted to the Pacific. The Government payrolls are still loaded with male and female pay rollers who vary their time from filling forms and mailing them out to harassed farmers and businessmen with mid-morning and tea-time half-hour recesses for cokes, cones and coffees. Yet in spite of the handicaps heaped on the farmer and his machine, the Diesels stand put in the sorry food mess mixed, concocted and stewed by the heavy light weights of Government bureaus messing with the food subject.

Caterpillar Diesel tractor with grass seed harvester in Sacramento Valley.



DIESEL LOCOMOTIVE FIRST ACROSS THE RHINE

By DOUGLAS SHEARING

IN the Third Quarter, 1944 issue of "Baldwin" reference was made to the work which had been performed by Whitcomb locomotives in the African campaign. That was only the beginning of a story of achievement, the final chapter of which was written recently on German soil.

These locomotives, which have proved so valuable to the Transportation Corps, were built by The Whitcomb Locomotive Company, a subsidiary of The Baldwin Locomotive Works. They are 65-ton Diesel-electrics especially designed by Whitcomb for the arduous tasks of war. Supercharged engines are used to provide sufficient power and, at the same time, permit the light axle loading required for foreign service. Continental tunnel clearances dictated the overall height and width of the locomotive and the contour of the cab roof.

After the success of the Allies in the African campaign, our first major victory of the war, the American Army moved into Italy, and the Whitcomb locomotives traveled right along with them. The first train into the City of Rome after its liberation by the Allies, was hauled by one of these sturdy veterans of the rails.

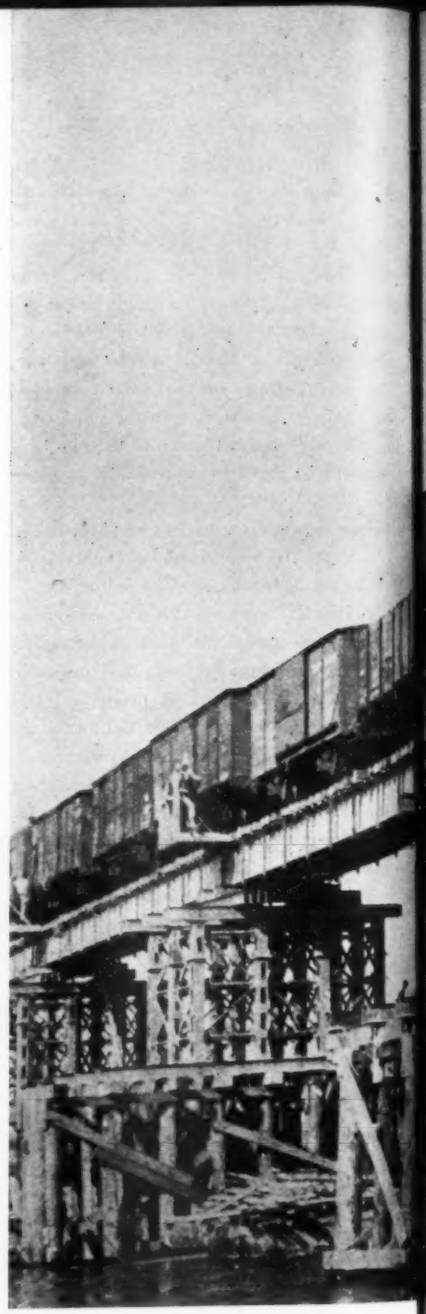
In June, 1944, came the Normandy invasion and the beginning of the real need for dependable rail transportation on the continent of Europe. Whitcombs were shipped across the channel from England by train ferry and were run directly onto the rails ready for service. Thereafter, they played an important part in the rehabilitation of the French Railway System. The first train into liberated Paris, as well as the first supply and hospital trains into Belgium, were drawn by Whitcomb Diesels.

When General Patton was making his historic drive toward the German border, the need for gasoline for his tanks was acute. On one occasion it necessitated the immediate movement of 38 cars of the precious fuel up to the front line. The Railway Operating Battalion responsible for this movement utilized one of the Whitcomb locomotives, and the tanks received their gasoline on schedule.

During the same drive, another of the Diesel locomotives came through with flying colors, hauling a trainload of badly needed ammunition over uneven rails, pitted roadbed and weakened bridges. The GI engineer at the controls of the locomotive had received only about ten minutes' instruction in its operation, before starting the trip. One of the bridges collapsed immediately after the train had passed over it but, once more, the supplies were delivered on time.

However, the Whitcombs were scheduled to play a part in a drama more important than any staged during the first drive into Germany. On April 9, 1945, a Whitcomb pulled the first United States Army train across the Rhine River. Army engineers, cooperating with the Transportation Corps' Second Military Railway Service, completed the first railroad link across the Rhine, at Wesel, Germany, on April 8, 1945. The connection consisted of a 1,752-foot, single track bridge over the river itself, and a 463-foot bridge spanning a nearby canal. The operation also involved the laying of approximately two miles of connecting track and the rearrangement of yard facilities at Wesel and Buderich, Germany.

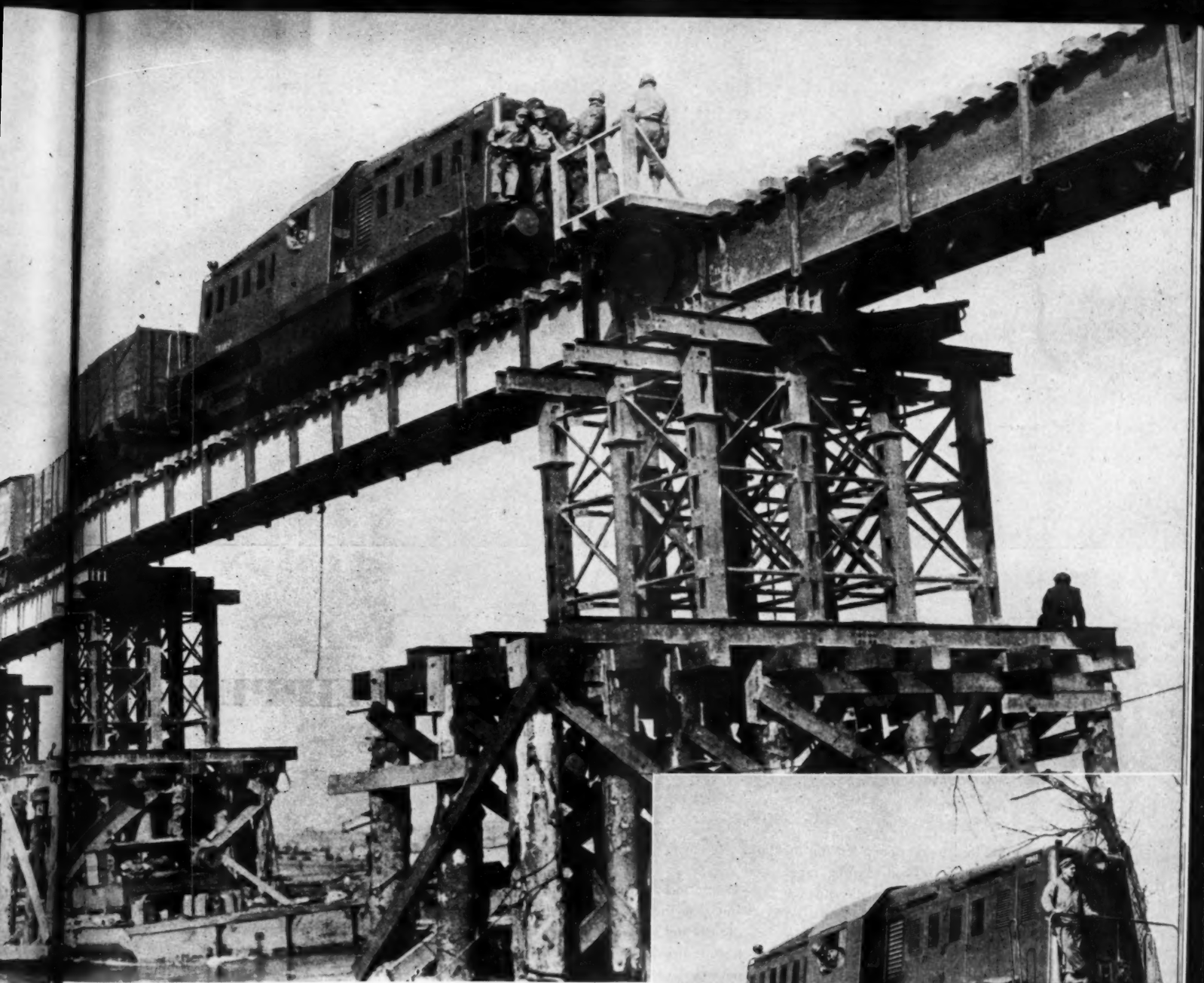
The story of the building of these bridges is one that has few equals, even in this war abounding in miracles. Starting construction on March 29 at 6 p.m. and working night and day, Army Engineer troops had the main bridge ready for traffic exactly 10 days, 4 hours and 45 minutes later. The short time in which the job was completed is all the more phenomenal in view of the fact that the exact location of the bridge was not known to the Army Engineers until 10 p.m. on March 26. Four possible sites had been under consideration but rapid military developments made Wesel the logical location. During the construction period, six Diesel locomotives were used to provide day and night service in the approach areas, bringing up and spotting materials and supplies.



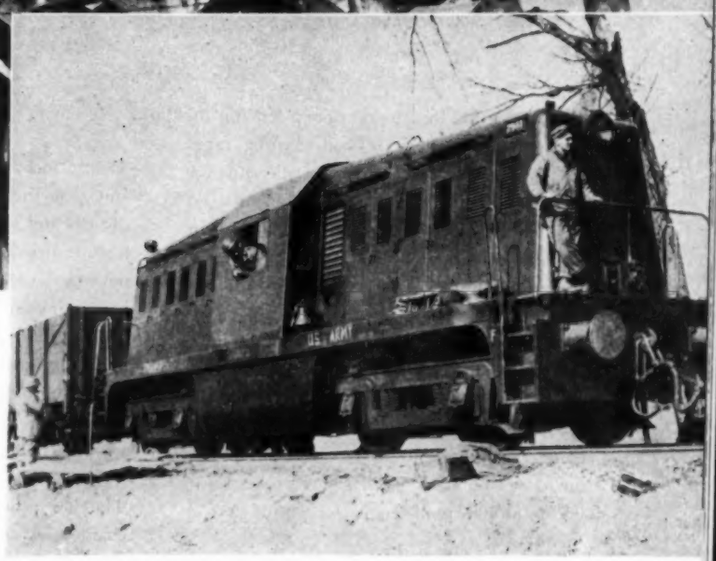
Transportation Corps train moves across Rhine at Wesel on bridge built by 9th U. S. Army units.

The bridge is a semi-permanent structure of 23 spans mounted on special prefabricated steel pier structures resting on wood piling. The deck and the railroad track are supported by meter-beams which form the spans between the piers. (Meterbeams are rolled steel I-beams, one meter in depth, rolled for the Germans at a plant in Luxembourg.)

Of the total bridge length of 1,752 feet, 1,074 feet are over water and the remainder represents the east and west approaches. Piles, driven to penetration of 30 feet, were placed in groups



All illustrations on these two pages are U. S. Signal Corps Photos.

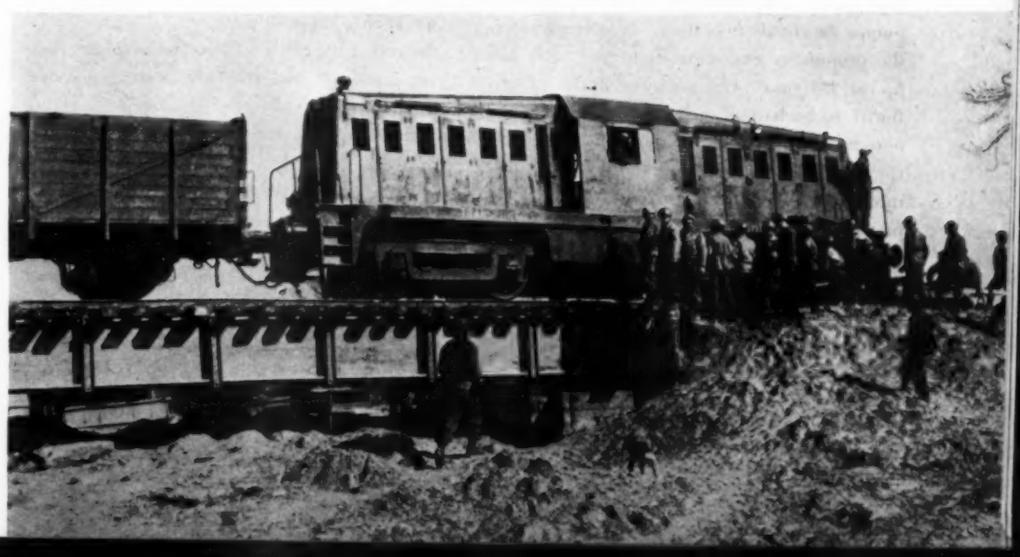


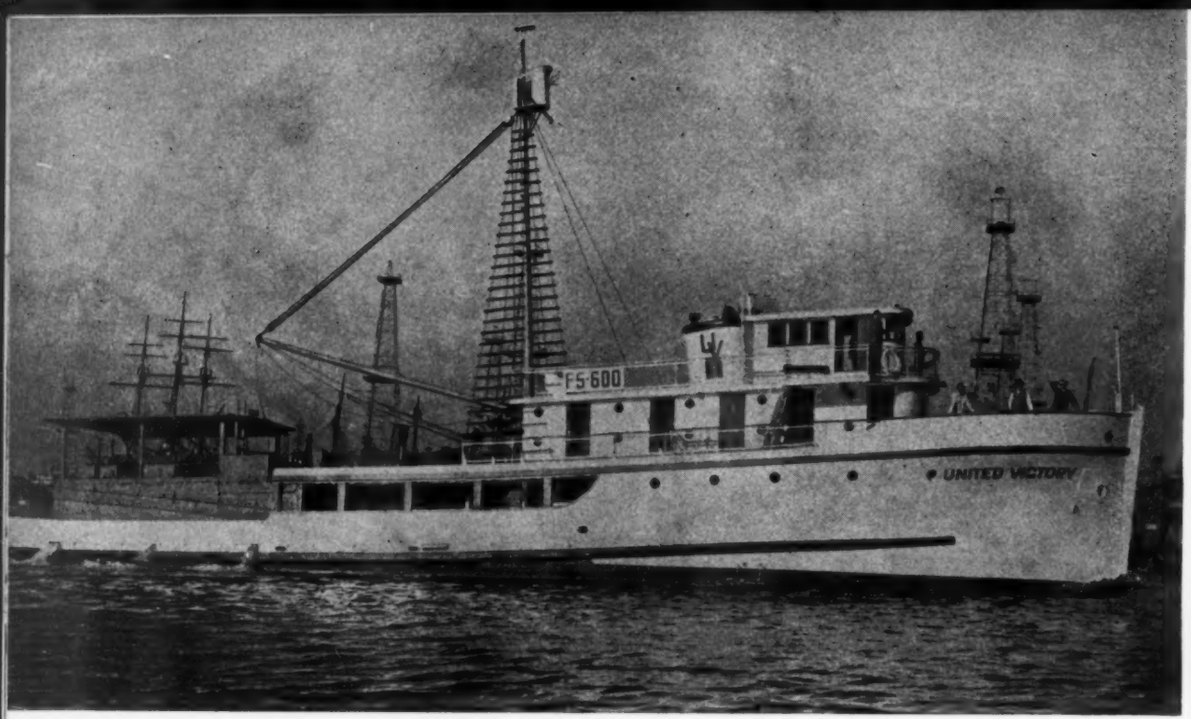
Whitcomb Diesel-electric locomotive first to cross the Rhine, awaiting go ahead signal.

Transportation Corps completes its first run across the Rhine on newly completed Engineer bridge.

of 21 to 24 for each pier. A total of 94 meter-beams were used, exclusive of those required to bridge the adjacent canal.

Early on the morning of April 9, 1945, the first train loaded with rations and other supplies moved over the bridge, into Germany's inner fortress, with a Whitcomb locomotive at the head end. One month later, almost to the day, the Germans surrendered and the actual war duty of the Whitcombs in Europe came to an end. However, there is still plenty of work for them to do, supplying the forces of occupation on which will fall much of the burden of rehabilitating the shattered railway system on the Continent.





First of her class, the 116 ft. Diesel Clipper, "United Victory" on trial run.

TURBOCHARGED DIESEL CLIPPER "UNITED VICTORY"

By JIM MEDFORD

INDICATIVE of the power trend in the new replacement fleet of modern long range tuna clippers serving Southern California fish processing plants, the 116-ft. *United Victory* just completed by Hodgson-Green-Haldeman, shipbuilders, Long Beach, California, is an excellent example.

Designed by Arthur DeFever, the yard's naval architect, and Frank Hodgson, owner-partner, the 303-gross-ton vessel is first in her class with turbocharged Enterprise direct reversible, mechanical injection, four-cycle, six-cylinder marine Diesel of 12-in. bore, 15-in. stroke, rating 600 hp. at 400 rpm.

Equipped with twin reversible centrifugal pumps for circulating either salt or fresh water, the propulsion unit unsupercharged rates 475 hp. at 333 rpm. The addition of the Elliott-Buchi turbocharger increases the horsepower output 26.3 per cent with but 77 additional rpm. of the 68-in. diameter and 42-in. pitch, three-blade propeller. Circulating water is passed through shell and tube Thermxchanger heat exchanger with surge tank incorporated in cooling line when engine is using closed fresh water system.

The turbocharger unit is entirely self-contained, and is connected to the engine only through the gas and air manifolds. It consists of a gas turbine driven by the gas exhausted from the power cylinders of the engine, and a centrifugal blower mounted on a common shaft, which supplies all the air required by the engine, under pressure through the conventional air intake manifold. The turbine utilizes a part of the energy in the exhaust gas which is otherwise wasted.

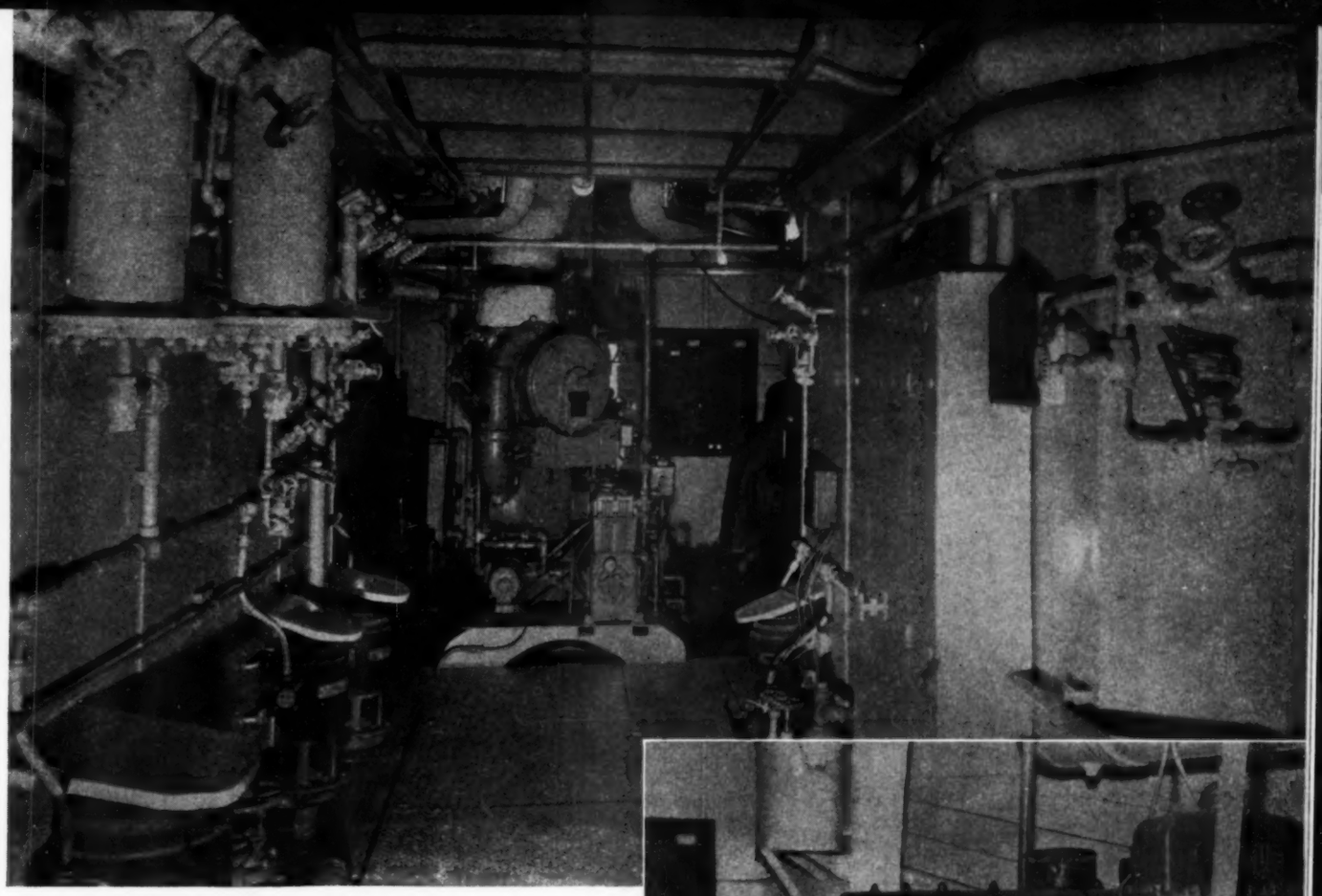
The low pressure air delivered by the turbocharger serves a dual purpose. First, it blows through the combustion space and valves, thus scavenging the residual gases otherwise left at the end of the exhaust stroke, and replaces these hot gases with cool, fresh air. Second, it results in an air charge of greater density at the end of the suction stroke.

All this means that the combined effect of the scavenging and pressure charging permits the combustion of a greater quantity of fuel without harmful effects to the engine, and consequently a higher output.

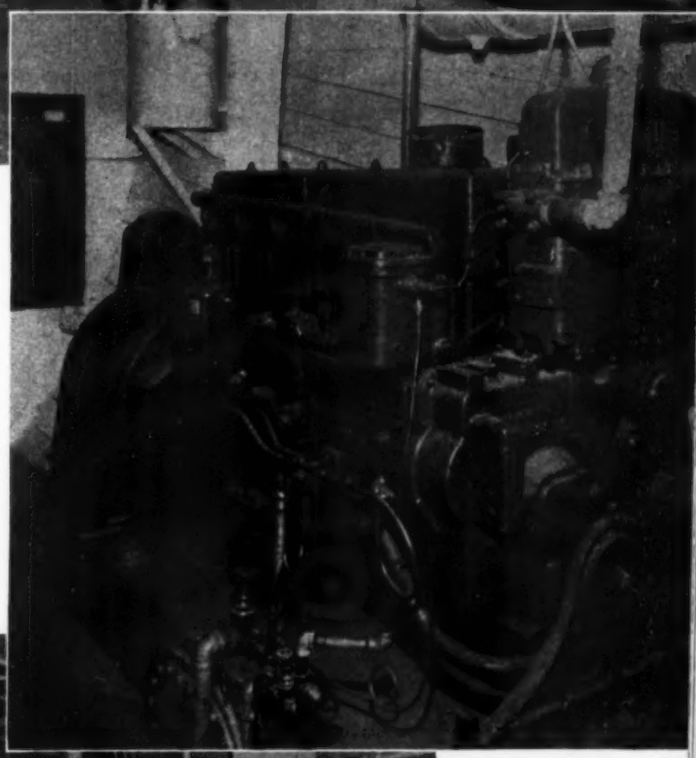
In addition, fuel and lube oil consumption are decreased, mechanical efficiency is higher, and at reduced speeds down to half, or less, engine torque can be maintained constant—and in some cases actually increased—without exceeding established temperature limits.

There are two auxiliary Diesels, both Caterpillars, of 112 continuous hp., direct connected to 75 kw. generators of the self-regulating type. These sets supplying a.c. current for the two 8-in. bait pumps delivering 2,250 gpm. each, all deck machinery and the four 3½ x 3½, four-cylinder refrigeration compressors set in the upper engineroom and driven by separate 15 hp. electric motors. Temperature as low as zero F. is possible for holding catch sharp-frozen and in dry condition.

Fuel capacity is 27,000 gallons, sufficient to make round trip to distant southern banks. Two of the fuel bunkers are so arranged that they can be cleaned when emptied of oil and used in refrigerated string of fish wells with a total of eight compartments with a combined capacity of 232 tons of fish.



Looking forward along shaft alley the Elliott-Buchi turbo-charger on the main Diesel is seen, center



One of two Caterpillar Diesel-electric auxiliary generating units.

Aft end of 600 hp. Enterprise main Diesel. Seen in this view are Winslow lube filter, upper left, U. S. oil pressure gauge, center, and Manzel lubricator, lower right.

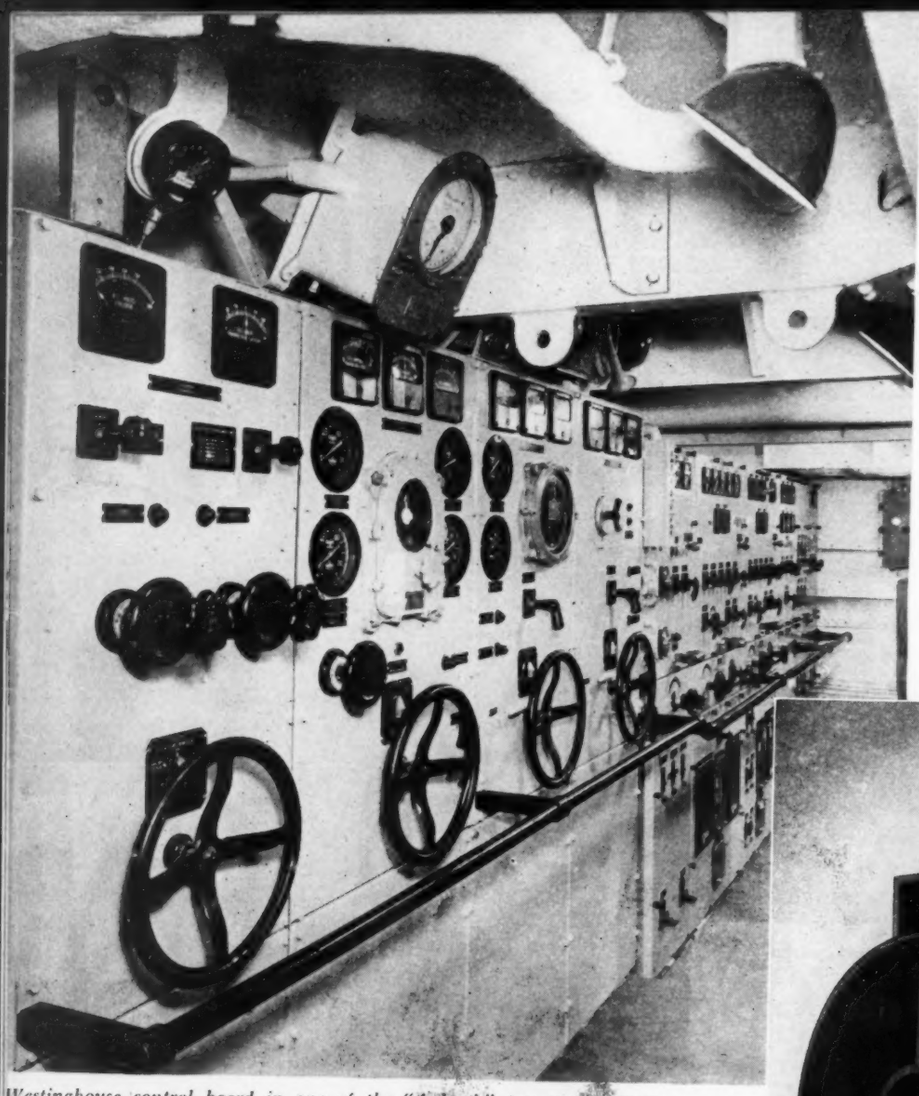
Accommodations are provided for a crew of 16 men all berthed on the boat deck. The galley, also located on the boat deck, is provided with running hot and cold water, oil-burning range and every convenience for the crew's comfort. As in all Portuguese-American clippers, the customary chapel with its hand-carved imagery and contrasting wood trim is provided.

The vessel was built for the account of Capt. John Rebelo, skipper, and associates. The actual dimensions are: length o.a., 115 ft. 10 in., beam, molded, 26 ft. 8 in., depth, molded, 13 ft. 3 in. Small boats carried are a 17 ft. 6 in., gasoline engine powered net dory and two skiffs, 12 ft. and 16 ft.

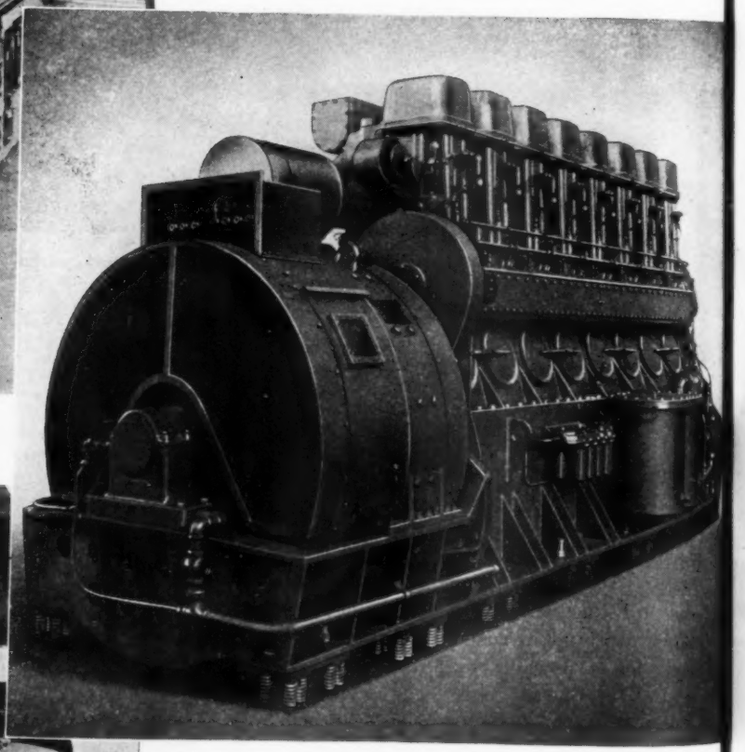
Equipment includes General Electric generators; Fairbanks-Morse motors and pumps; Crane water valves; Ross lube oil coolers; fuel oil is passed through Purolator and Winslow filters; lube oil is Shell and is filtered by Cuno; auxiliary engine air is filtered by Donaldson; exhaust is checked by Alnor pyrometer; tachometer is a Weston; auxiliaries exhaust silenced by Kittell.

DIESEL AM CLASS MINESWEEPER

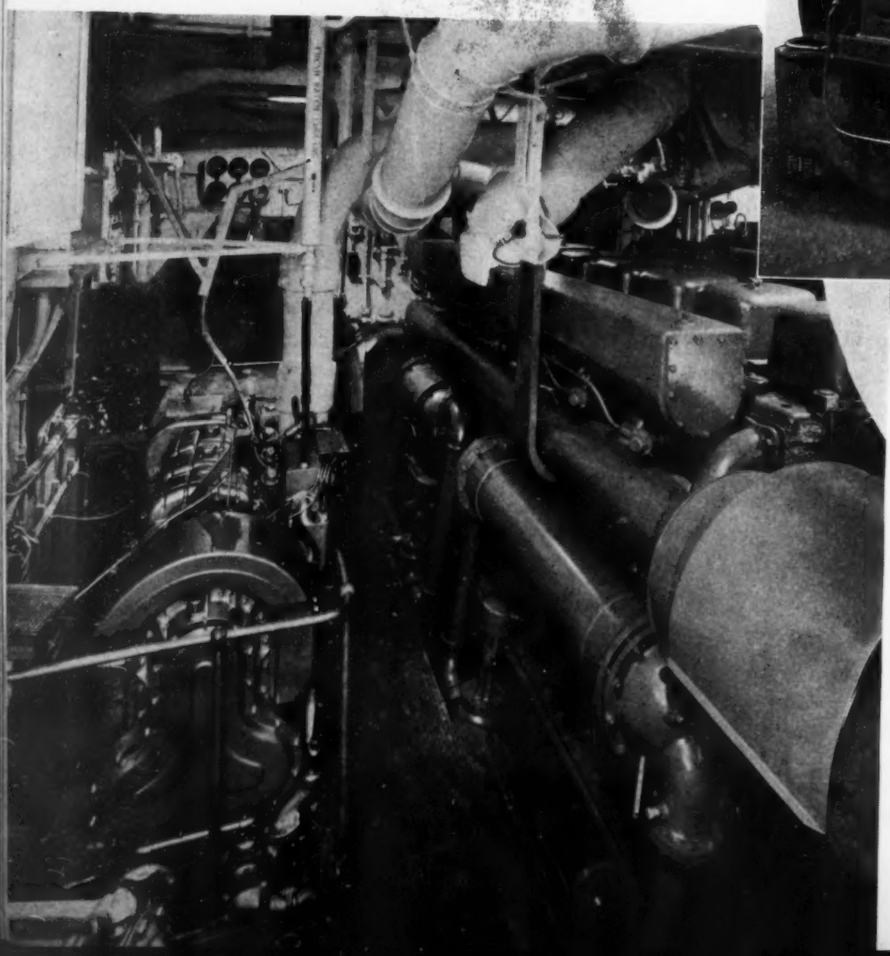
By DOUGLAS SHEARING



Westinghouse control board in one of the "Ardent's" two engine rooms.



One of the four Baldwin 1000 hp. Diesels and Westinghouse generators which supply main propulsion power.



Partial view of one engine room showing one Baldwin main Diesel, right and one General Motors auxiliary Diesel, left.

AMONG the vessels completed during the past year at the Alameda plant of the General Engineering and Dry Dock Company is the twin-screw 1,100 ton displacement minesweeper *Ardent*, one of eight minesweepers of the AM class, designed by the Norfolk Navy Yard. Her length is 222 ft. overall; 215 ft. bp. with 32 ft. breadth and 17 ft. molded depth. Like many wartime ships for the Navy, she has a Diesel-electric geared twin propulsion plant arranged in two engine rooms, one forward of the other.

In each of the dual engine rooms there are two Baldwin eight-cylinder, 12¾ in. by 15½ in., four-cycle, trunk-piston Diesel engines, directly coupled to Westinghouse 500-720 kw. 250-volt generators of the direct-current type.

The continuous output of each main Diesel engine according to commercial rating is 1,000 bhp. at 600 rpm., and 1,055 bhp. at 625 rpm. for maximum power. However, the Navy's standard practice is to rate down all oil engines, so the power of the ship is based upon 720 bhp. at 560 rpm., or a maximum of 900 bhp. at 625 rpm. At 720 bhp. the bmep. is 64.4 psi. while at the commercial load the bmep. is 80.2 psi. Piston speed is 1,615 ft. per minute.

In each of the engine rooms two 882 bhp. electric propelling motors are installed, as well as the main generator sets and General Motors Diesel auxiliary generating sets. Between the motors and the propeller shafts are Westinghouse reduction gears having a ratio of about 2.5 to 1. To give an idea of the compactness of the machinery, the engine rooms are but 32 ft. long, or a total machinery space of 64 ft., including the electric type twin propelling motors. Along the engine room sides are the wing oil tanks, but fuel also is carried in the double bottom of the hull.

The twin 882 bhp. electric motors geared to each of the two propeller shafts are of 250 volts; and are capable of taking the maximum power output of the Diesel-generator units at any speed from 700 to 900 rpm., the reduction gears bringing down the propeller revolutions to an efficient point. As the vessel is fine-lined, she has an excellent turn of speed, which is omitted for security reasons. In conformance with sound marine engineering design there is a good reserve of power, because over 4,000 bhp. could be produced from the Diesels and 3,528 bhp. transmitted to the propellers if necessary. Even with the Navy's conservative rating, the maximum aggregate engine power is 3,600 bhp., so she has nearly four horsepower for every displacement ton, compared with about one-half horsepower for each Maritime Commission Victory ship displacement ton.

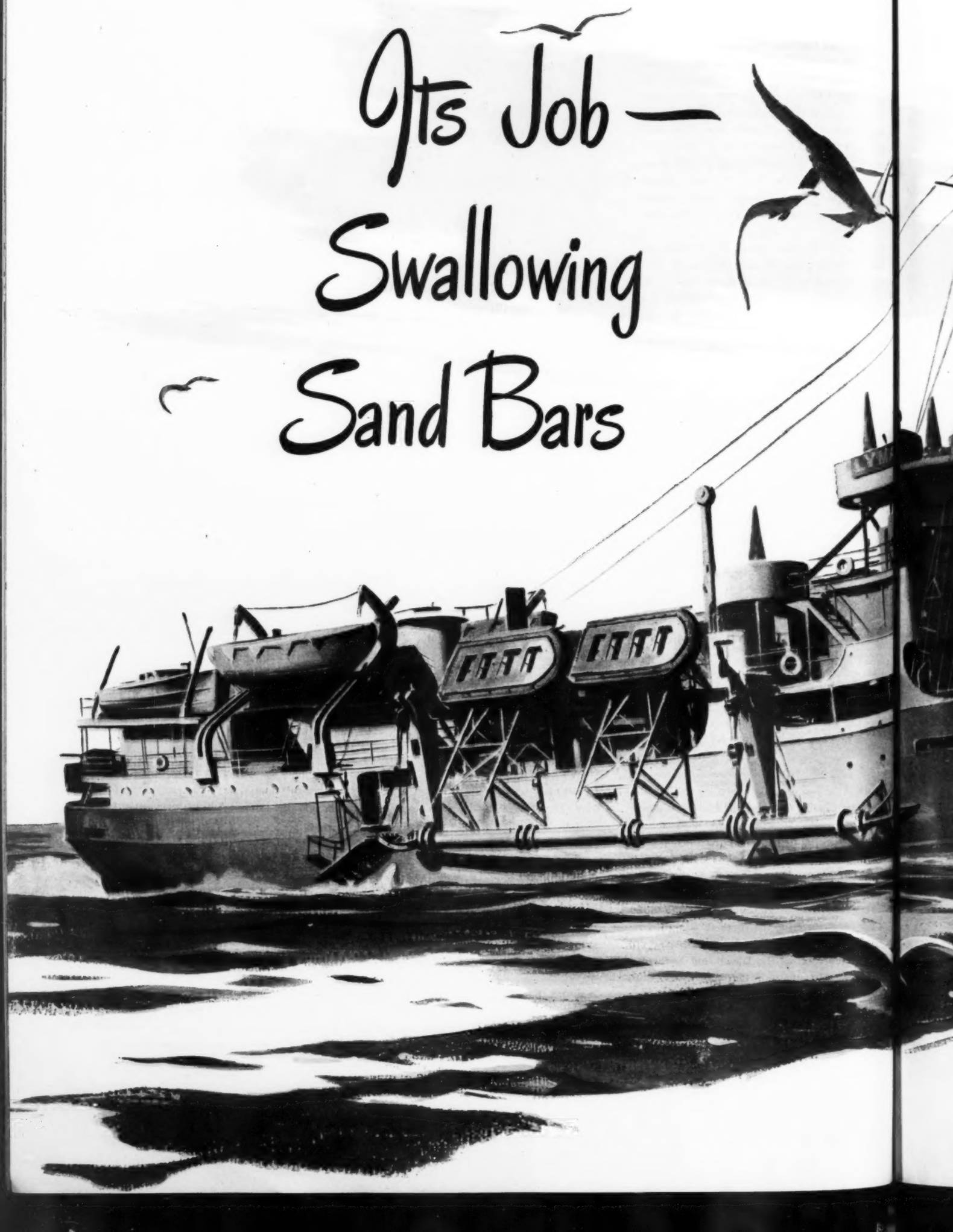
Minesweeper USS "Ardent" on trial run.

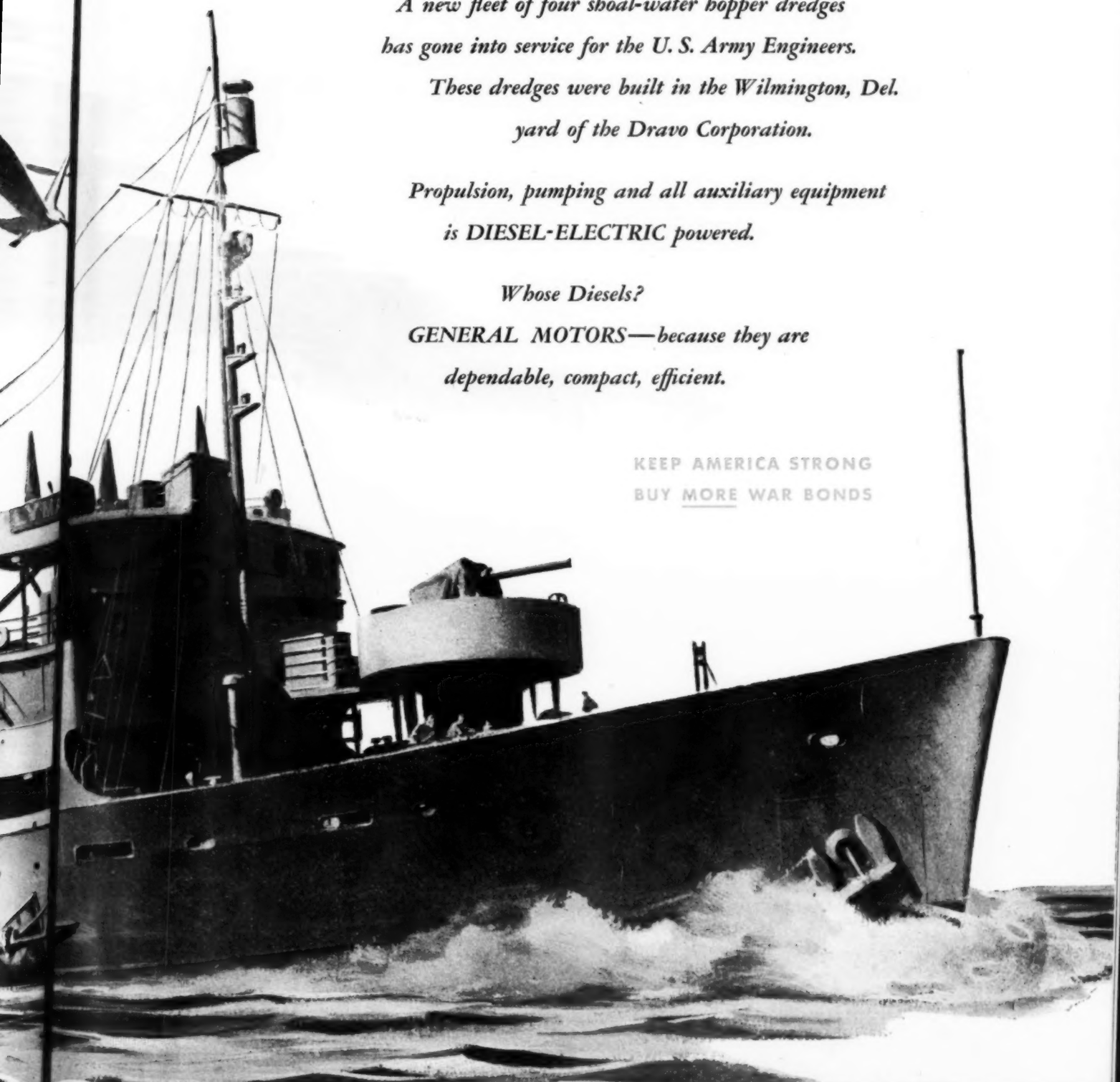
In accordance with standard Baldwin practice, both the bedplate and the frame are of welded steel to give lightness and added strength as compared with cast iron. The frame forms the cylinder housing and the upper part of the crankcase. All cylinder liners are machined inside and outside, and are then finished internally by honing. Each has a flange at the top that seats in the engine frame, the joints being sealed at the lower end with rubber rings. This feature permits free expansion and contraction of the cylinder liner in accordance with temperature changes.

Inlet and exhaust valves are push-rod and rocker-operated from a chain-driven camshaft, and are carried in bearings mounted on the front of the engine frame. Individual fuel injection pumps are also driven by this camshaft, and in the shop view of the engine the fuel lines and the American-Bosch fuel pumps can be seen between the push-rods.

A feature of the Baldwin engine is the controlled turbulence spherical combustion chamber system with its multiple-opening spray nozzle. The chamber forms an integral part of the cylinder head and is completely water cooled. The purpose of this arrangement is to permit the compressed air from the cylinder produced by the rising piston to enter the combustion chamber tangentially at high velocity, and so produce a vigorous turbulence. Then the multi-jet nozzle sprays the fuel finely and the latter mixes rapidly with the turbulent air.

Its Job — Swallowing Sand Bars





A new fleet of four shoal-water hopper dredges has gone into service for the U. S. Army Engineers. These dredges were built in the Wilmington, Del. yard of the Dravo Corporation.

Propulsion, pumping and all auxiliary equipment is DIESEL-ELECTRIC powered.

Whose Diesels?

GENERAL MOTORS—because they are dependable, compact, efficient.

KEEP AMERICA STRONG
BUY MORE WAR BONDS

GM
GENERAL MOTORS
DIESEL POWER

ENGINES . *150 to 2000 H.P.* **CLEVELAND DIESEL ENGINE DIVISION,** *Cleveland 11, Ohio*

ENGINES . . . *15 to 250 H.P. DETROIT DIESEL ENGINE DIVISION, Detroit 23, Mich.*

LOCOMOTIVES . . . . . *ELECTRO-MOTIVE DIVISION, La Grange, Ill.*

ALTON OPERATES TEN FEATURE TRAINS WITH ONLY FOUR DIESEL LOCOMOTIVES

By CHARLES F. A. MANN

AFTER a three-year lull in building passenger Diesel locomotives, lifting WPB restrictions at the year-end have suddenly revived the once dramatic impetus toward Dieselization of the nation's principal passenger trains.

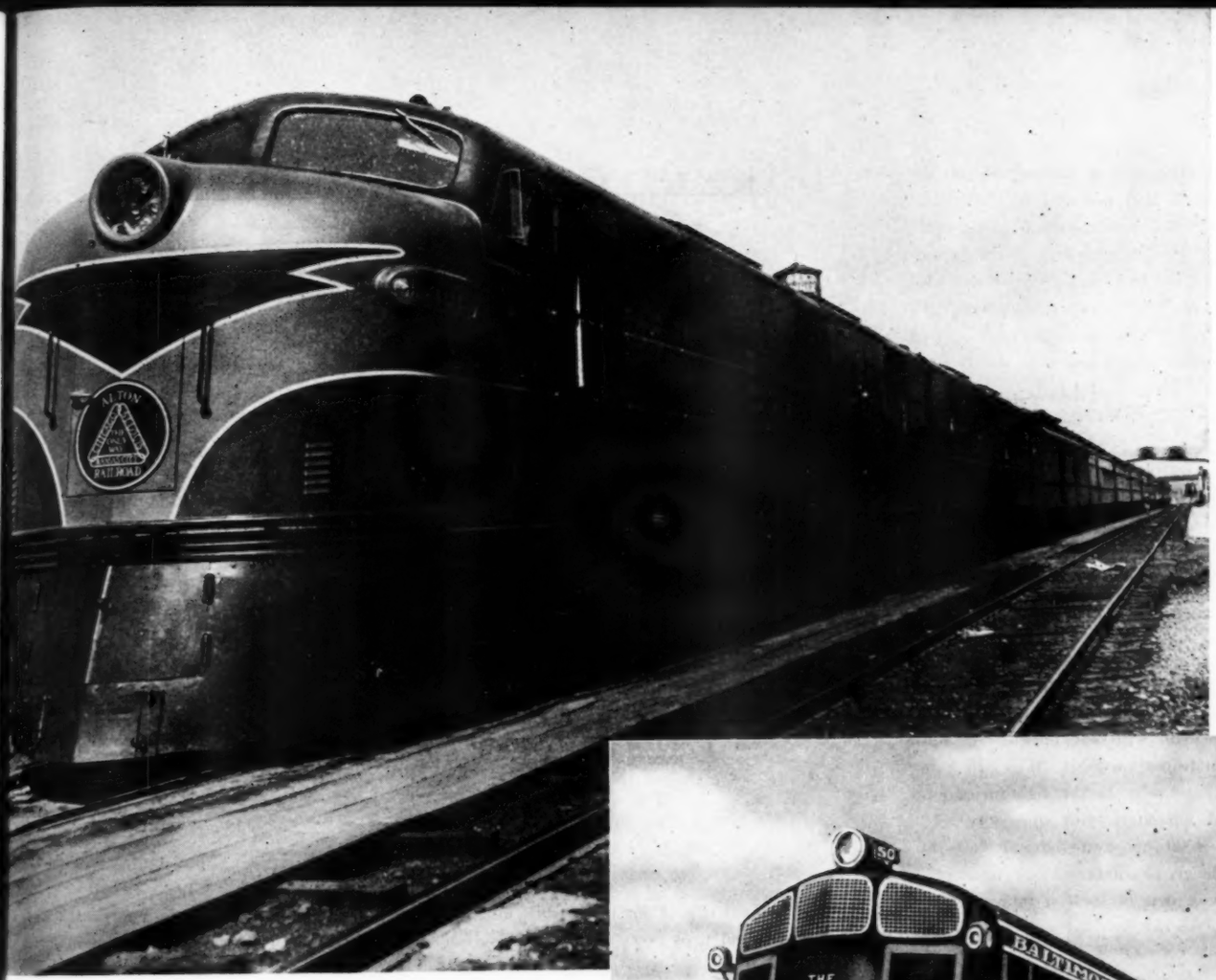
The old 1941 order-files for Diesel passenger power have been kept intact, and now, after a long period devoted exclusively to building big Diesel freight and hundreds of Diesel switchers to handle the crushing war load of railroad freight, passenger Diesels have also been given the green light, principally on the basis of priorities built up by old unfilled orders and filling motive power needs where the pressure was greatest.

Almost first to get badly needed Diesel units was the Alton Railroad, busy little vital short line between Chicago and St. Louis-Kansas City, once part of the Baltimore & Ohio system, but since separated off into a little company all by itself. Key to its operations is the short, busy Chicago-St. Louis trunk line, a double track speedway that cuts down through Illinois to Springfield, the State Capital, and St. Louis, a distance of 284 miles.

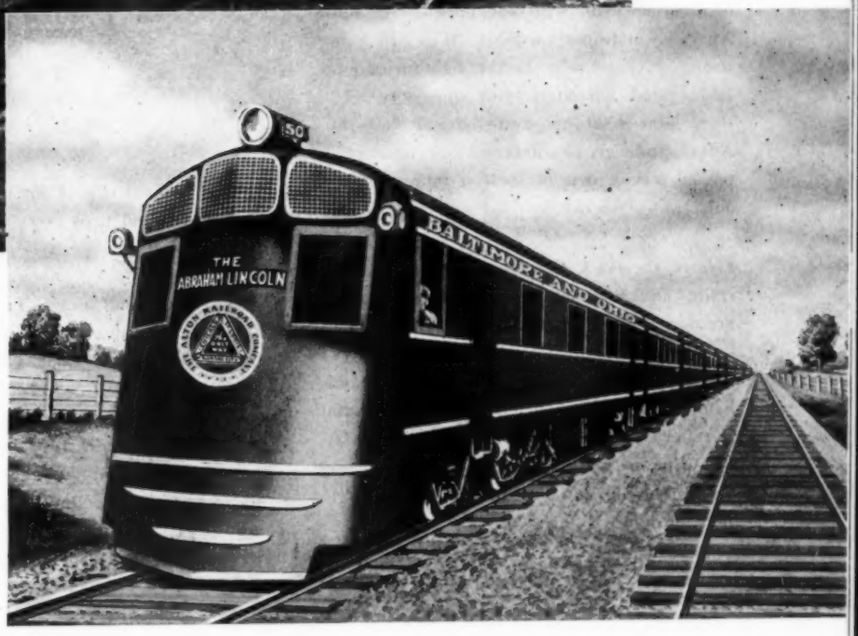
Right now both railroad and financial circles are abuzz with nearly finished plans to hook up the Alton with the Gulf, Mobile & Ohio into a compact, unified system of about 3,000 route miles, which, interestingly, has the likely chance of becoming the very first U. S. railroad, if not the first in the entire world, having every mile of its entire mainline operation completely Dieselized. Having no sticky tie-ups with big-league coal interests; traversing a rich

Old "No. 50" appears like this today—a single-unit 1800 hp. Electro-motive Diesel locomotive in service on the Alton since 1936.

Double cab, double end Electro-motive 4000 hp. Diesel-electric locomotive, three of which were delivered to the Alton last March.



Today's 14-car "Abraham Lincoln" pulling into Bloomington, Illinois.



One of America's first Diesel-electric trains, the "Abraham Lincoln" back in 1936, with the original "No. 50" Diesel locomotive.

industrial and agricultural territory demanding high-speed rail transportation based on its merits rather than coal mine, financial or sentimental politics, and best of all a huge proven oil field right in the middle of the GM&O part of the system—the scheme to Dieselize the whole unified system looks feasible from every viewpoint, and economically sound on all fronts. America should have at least one completely Dieselized railroad to work down to a fine point the ultimate, unrestricted economics and economies of an all-Diesel operation. The dual and triple power setup on most U. S. railroads obviously to all concerned, have tended to restrict and complicate the economies and advantages of steam, Diesel and electric operation, not to overlook the human element of a company involved in all types of motive power. Conversely, the Diesel industry of the U.S.A. looks with favor on a completely coal-fired steam railroad operation; one with 100% oil burning steam and another 100% electrified, to eliminate the weird aspects of some systems trying to dabble with Diesel or electric, yet keeping tongues in their cheeks on Diesel, with resultant wastage, weird "research" programs and endless years of uncertainties. And in the end, nothing gained.

So keep your eye on the Alton-GM&O combination in the immediate future. The Alton has earned the right to a "first" in the Diesel picture, for it was back in April 1936 when its Parent, the Baltimore & Ohio assigned a single-unit 1800 hp. Diesel locomotive built by ElectroMotive Corporation to work on the Alton, specifically to pull the streamliner "Abraham Lincoln"—one of the very first U. S. streamliners and among the first six Diesel trains in the whole country.

Later on, what is now known as the "A" unit of Diesel Locomotive No. 50 on the Alton, a second 1800 hp. ElectroMotive Diesel, was added, and the two coupled up at the Alton's Bloomington shops on October 11, 1940. The "Abraham Lincoln" has grown from a little 6 car train to a 12-14 car streamliner, one of the heaviest patronized in the U.S.A.

During March, 1945, the Alton received three double-cab, double-end 4,000 hp. passenger Diesels from the ElectroMotive Division of General Motors Corp.—the first of any type Diesel passenger power received by the Alton

since 1940. The quaint photograph of the original No. 50 that powered the "Abraham Lincoln," with its top air grille over the snub-nosed cab; 4 wheel trucks, baggage car appearance and square fuel tanks, contrasted with the big smooth 4,000 hp. locomotives of 1945, almost, without words, tells the whole story of the evolution of Diesel passenger power from its beginning with the Burlington Zephyr in 1935 to the summer of 1945!

We might pose the question: How on earth has the "Abraham Lincoln" Diesel lasted this long? Probably 1½ million miles have been run off by this locomotive on what might be classed as pure pioneering. Actually, as of April 1, 1945, Alton Diesel No. 50, first original General Motors Diesel that was detached and a unit all by itself has piled up 1,626,492 miles. This total was attained both while working as a single-unit 1800 hp. road engine and in tandem, after 1940, with the added "A" unit. After 9 wondrous years, No. 50 is still going strong . . . we refer to the tight-turnaround table listed separately with this story. The three new 4000 hp. and the old 3600 hp. Alton passenger locomotives are now in a pooled service that in itself is rather remarkable.

Five of the crack Chicago-St. Louis passenger trains and five St. Louis-Chicago passengers are now Diesel operated. Each of the 4 Diesels operates approximately 568 miles each 24 hours, with the longest layover at St. Louis before starting back being 7 hr. 58 min. and the shortest, 2 hr. 30 min. At Chicago the layover time is reduced almost to zero, ranging from 3 hr. 40 min. on one trip down to 45 min. on another.

Gross daily Diesel mileage for the ten round trips is 2840 miles, with certain of the 4 Diesels making a round trip of 568 miles while others make 1½ round trips every other day in progressive rotation.

Southbound from Chicago, Trains 19, the "Ann Rutledge"; 1, the "Alton Limited"; 3, the "Abraham Lincoln"; 5, "The Mail" and 7, "The Fast Mail" are all-Diesel. Northbound, out of St. Louis the same trains are handled excepting the Diesel runs on the "Midnight Special" instead of "The Mail," which does not operate Northbound.

Servicing of the Diesel locomotives is done at the 21st St. Coach Yards in St. Louis, except heavy repairs which are done at Bloomington shops. Working under H. B. Voorhees, Chief Executive Officer in the Diesel program is C. M. House, Supt. of Motive Power at Chicago.

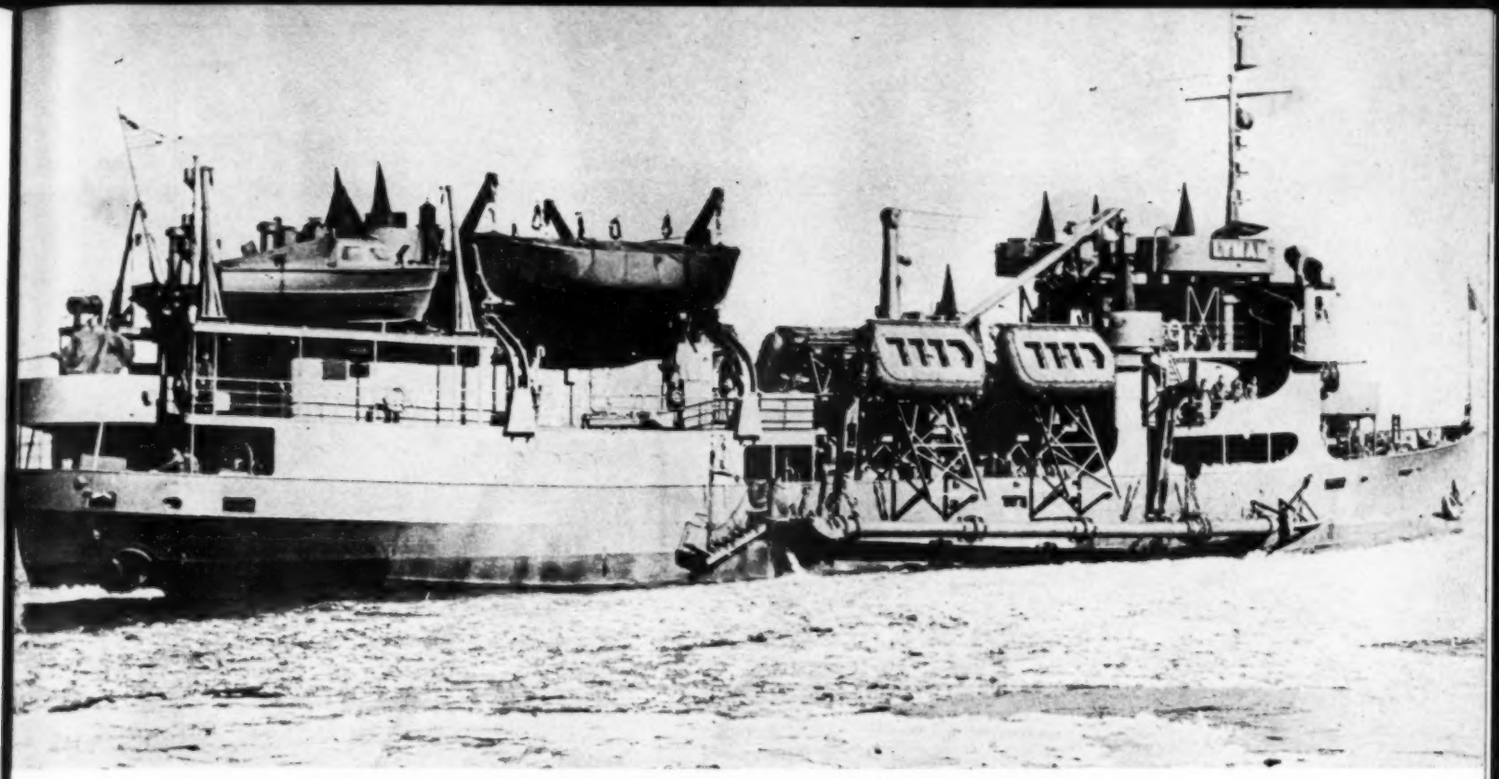
In addition to the fleet of four passenger Diesels, all built by General Motors, the Alton also has fifteen 1000 hp. Americal Locomotive Co.'s Diesel switchers—a fair start on their Dieselization of the switcher fleet.

The Alton's interesting and highly effective use of a relatively small fleet of Diesel passenger locomotives will be watched with interest everywhere. It is a perfect example of wise spending for road power with the thought of getting the maximum efficiency and operating profit back in the shortest possible time.

SCHEDULE OF DIESEL POWER ON TEN ALTON TRAINS USING FOUR ALTON DIESELS, 50, 101, 102, AND 103 - TRAINS 1, 2, 3, 4, 5, 7, 8, 10, 18, 19 - P-16 CLASS STEAM ON TRAINS 6 AND 9.

ST. LOUIS						CHICAGO					
	Arrive		Depart				Arrive		Depart		
Eng. No.	Tr.	Time	Tr.	Time	Elapsed Time	Eng. No.	Tr.	Time	Tr.	Time	Elapsed Time
FIRST DAY											
50	5	1:00 AM	2	8:58 AM	7'58"	102	8	6:30 AM	19	8:15 AM	1'45"
101	7	7:08 AM	4	11:55 AM	4'47"	103	10	7:45 AM	1	11:25 AM	3'40"
102	19	1:45 PM	18	4:30 PM	2'45"	50	2	2:08 PM	3	4:50 PM	2'42"
103	1	5:15 PM	8	11:45 PM	6'30"	101	4	5:45 PM	5	6:30 PM	0'45"
50	3	10:00 PM	10	12:30 AM	2'30"	102	18	9:40 PM	7	11:30 PM	1'50"
SECOND DAY											
101	5	1:00 AM	2	8:58 AM	7'58"	103	8	6:30 AM	19	8:15 AM	1'45"
102	7	7:08 AM	4	11:55 AM	4'47"	50	10	7:45 AM	1	11:25 AM	3'40"
103	19	1:45 PM	18	4:30 PM	2'45"	101	2	2:08 PM	3	4:50 PM	2'42"
50	1	5:15 PM	8	11:45 PM	6'30"	102	4	5:45 PM	5	6:30 PM	0'45"
101	3	10:00 PM	10	12:30 AM	2'30"	103	18	9:40 PM	7	11:30 PM	1'50"
THIRD DAY											
102	5	1:00 AM	2	8:58 AM	7'58"	50	8	6:30 AM	19	8:15 AM	1'45"
103	7	7:08 AM	4	11:55 AM	4'47"	101	10	7:45 AM	1	11:25 AM	3'40"
50	19	1:45 PM	18	4:30 PM	2'45"	102	2	2:08 PM	3	4:50 PM	2'42"
101	1	5:15 PM	8	11:45 PM	6'30"	103	4	5:45 PM	5	6:30 PM	0'45"
102	3	10:00 PM	10	12:30 AM	2'30"	50	18	9:40 PM	7	11:30 PM	1'50"
FOURTH DAY											
103	5	1:00 AM	2	8:58 AM	7'58"	101	8	6:30 AM	19	8:15 AM	1'45"
50	7	7:08 AM	4	11:55 AM	4'47"	102	10	7:45 AM	1	11:25 AM	3'40"
101	19	1:45 PM	18	4:30 PM	2'45"	103	2	2:08 PM	3	4:50 PM	2'42"
102	1	5:15 PM	8	11:45 PM	6'30"	50	4	5:45 PM	5	6:30 PM	0'45"
103	3	10:00 PM	10	12:30 AM	2'30"	101	18	9:40 PM	7	11:30 PM	1'50"
FIFTH DAY											
50	5	1:00 AM	2	8:58 AM	7'58"	102	8	6:30 AM	19	8:15 AM	1'45"
101	7	7:08 AM	4	11:55 AM	4'47"	103	10	7:45 AM	1	11:25 AM	3'40"
102	19	1:45 PM	18	4:30 PM	2'45"	50	2	2:08 PM	3	4:50 PM	2'42"
103	1	5:15 PM	8	11:46 PM	6'30"	101	4	5:45 PM	5	6:30 PM	0'45"
50	3	10:00 PM	10	12:30 AM	2'30"	102	18	9:40 PM	7	11:30 PM	1'50"

Electro-motive 4000 hp. Diesel-electric locomotive No. 101 hauling the "Ann Rutledge" out of Union Station, St. Louis.



Army Engineer Hopper Dredge "Lyman" on trial trip in the Delaware River.

FOUR NEW ALL-DIESEL HOPPER DREDGES

For Army Engineers

By DWIGHT ROBISON

FOUR new ocean-going hopper dredges, built to specifications of the Army Engineers Corps' Marine Design Section, have been completed at the Wilmington, Delaware, yardsof the Dravo Corporation and are now in operation. Designed for shoal water dredging under the direction of Colonel Harry B. Vaughan, district engineer at Philadelphia, the dredges have a loaded draft of only 12 ft. 6 in., an over-all length of 215 ft. 11 in. and a beam of 53 ft.

Propulsion power is supplied by two 12-cylinder, 2-cycle Diesel engines built by the Cleveland Diesel Engine Division of General Motors which drive the vessels when light at a speed of 13½ knots. In addition the same Division has provided the auxiliary power which consists of two 6-cylinder Diesel generator sets and one single-cylinder generator set.

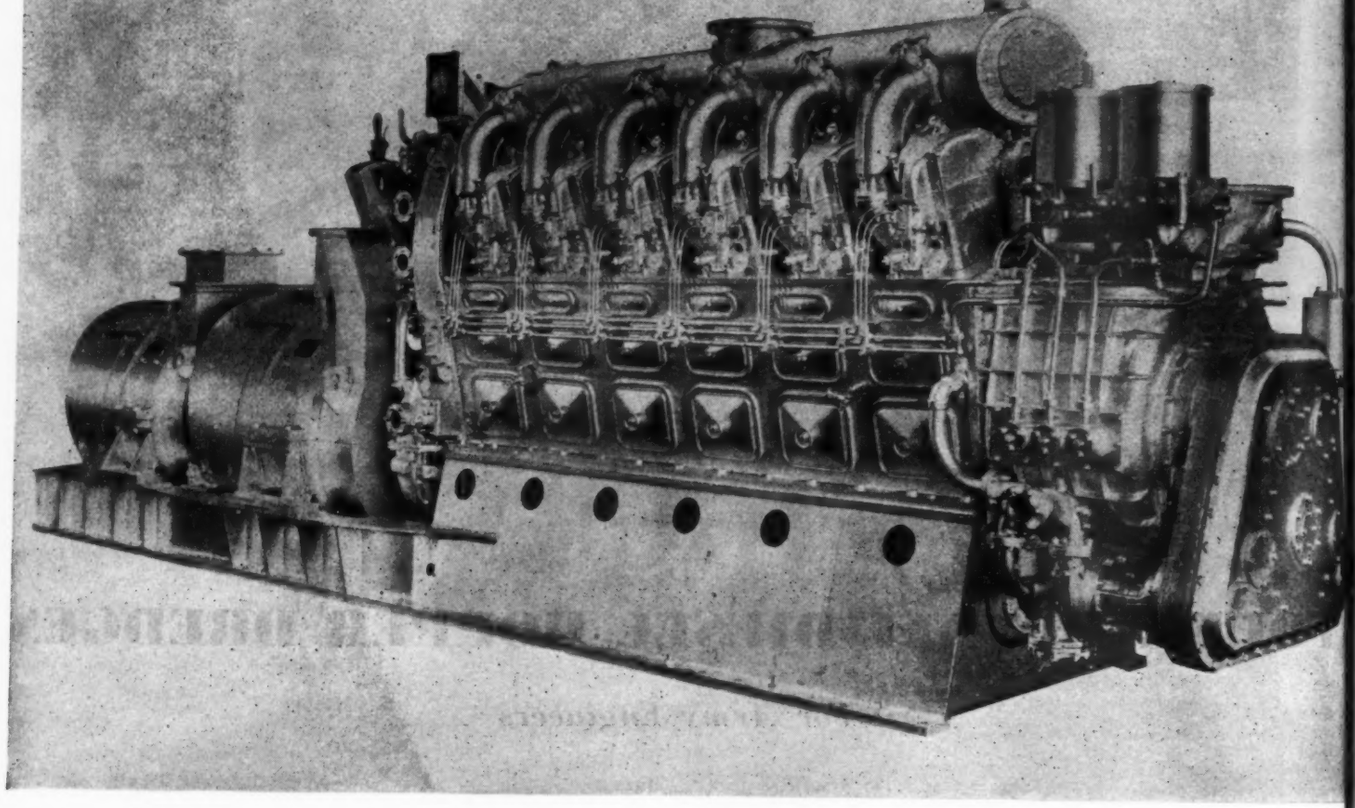
Prime factors in the design of the vessels were keeping to a minimum the maximum draft and to provide as much speed as possible in order to reduce the non-dredging period. To accomplish these objectives the vessels were designed for a light draft of only 8 ft. 2 in. and the two 950 hp. Diesel engines drive them with a load of 700 cubic yards at a speed of 11¼ knots making them the fastest of Engineers' Department's smaller sea-going dredges.

The use of a single twin-suction, electrically driven pump, the power for which is also provided by the two 12-cylinder main Diesels, permits taking aboard a full load in 36 minutes, further increasing the efficiency of the dredge.

To permit ease of handling in confined harbors and tidal rivers, the dimensions of these dredges have been kept to a length between perpendiculars of 212 ft., and a moulded beam of just over 40 ft. The over-all beam is 53 ft. and this includes the 18 in. suction drag pipes, which penetrate the hull on each side in way of the pump room. They have common connection with the single 420 hp. dredge pump located on the vessel's centerline, well below the light load water plane. The pump's main 20 in. diameter riser is branched into two 20 in. diameter discharge pipes, which run over the full length of the eight hoppers. Manually controlled nozzles, operated from catwalks over the hoppers, are provided on these pipes. Hollow steel gates are arranged for manual raising and lowering along the tops of the hopper overflow coamings, which increases the hopper capacity when the dredging of certain types of material makes this advisable.

The load is dumped through eight hydraulically controlled doors in the ship's bottom, by an actuating fluid force of 300 lbs. per square inch, introduced into cast steel cylinders through three-way valves at each hopper control station. The constant 300-pound pressure is maintained in a 55-gallon tank by means of an electrically driven 100-gpm. centrifugal pump connected to a reserve oil reservoir. When closed, the doors are mechanically locked shut so that the need for maintaining the hydraulic pressure is removed.

The prime movers and auxiliaries are located in the compactly arranged, sound-proof engine room aft. The two 12-cylinder, 950 bhp. General Motors Diesel engines, mounted on anti-vibration units, are each directly connected to two generators, one of which is used exclu-



Two 12-cylinder General Motors Diesel-electric generating units, like the one shown, supply power for propulsion and dredge pumps.

Preparing to start one of the main General Motors Diesels.

sively for propulsion at 565 kw., 600 volts, direct current, shunt wound for separate excitation at 240 volts; the other generator at 310 kw., 240 volts, separately excited for driving the dredge pump motor. The field control of both generators on each engine shaft allows vernier propeller and dredge pump motor speed.

The shunt wound, 700-bhp. propelling motors are located in a watertight compartment aft of the engine room. They are also separately excited and drive both propeller shafts up to 190 rpm. through single reduction gear sets. The compound wound dredge pump motor, through the variable field control method, covers continuously a speed range from 190 to 240 rpm. The propulsion motors have direct electrical control both in the wheelhouse and in the engine room, supplemented by three marine telegraphs on the bridge.

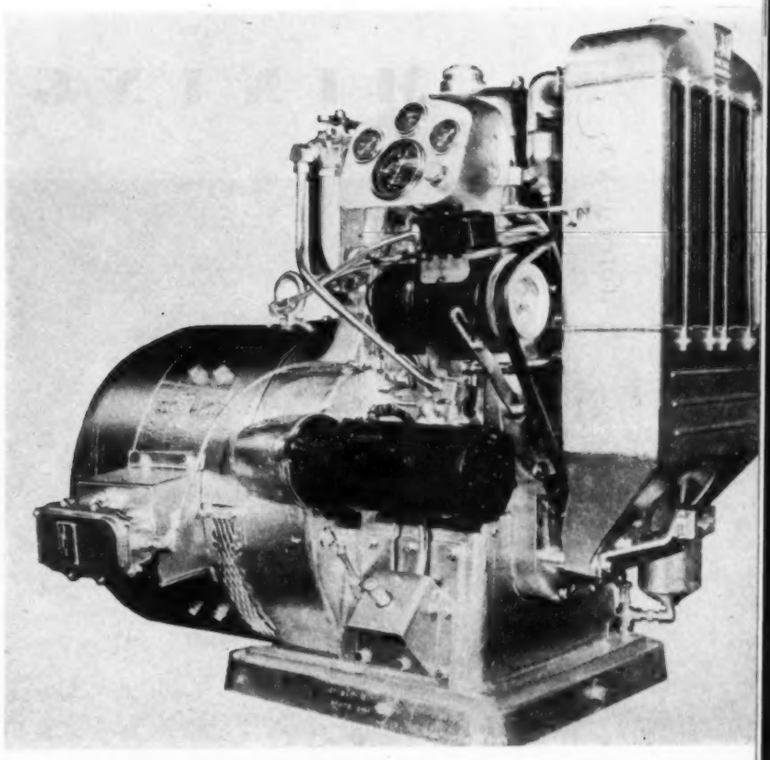
The need for vernier speeds dictated variable

generator field intensity for the control of the two 40-hp., 230 volt, shunt wound, drag pipe winch motors, which obtain their power from a specially designed motor generator set consisting of a 75-hp. motor directly connected to two 35-kw. generators, having sufficient differential series field winding to effectively void the residual field when the shunt field is de-energized. Extending the perfection of this form of control to manual manipulation at its source, so-called "finger-tip" weather-enclosed rheostats have been mounted on pedestals in each drag tender's house. Full voltage may thus be applied in hoisting or lowering the drag pipes by a total lever throw of only 75 degrees, which marks a commendable advance because it enhances the ability of the drag tenders in keeping the drag heads in proper contact with the ocean floor, a technique which determines the speed with which a pay load may be taken aboard.

To further this technique, the vessel is equipped with a 4-foot diameter dial, continuously self-correcting for the vessel's draft, whereby the distance between the drag head and the surface of the water is constantly shown within full vision of the drag tender's houses. There is also an indicator on the after drag davits to continually show the transverse travel of the drag head under water—that is, how far it is working under the vessel's hull and how far outboard of it, regardless of the ship's list. This is essentially a safety measure against drag pipe rupture by untoward contact with the vessel's hull.

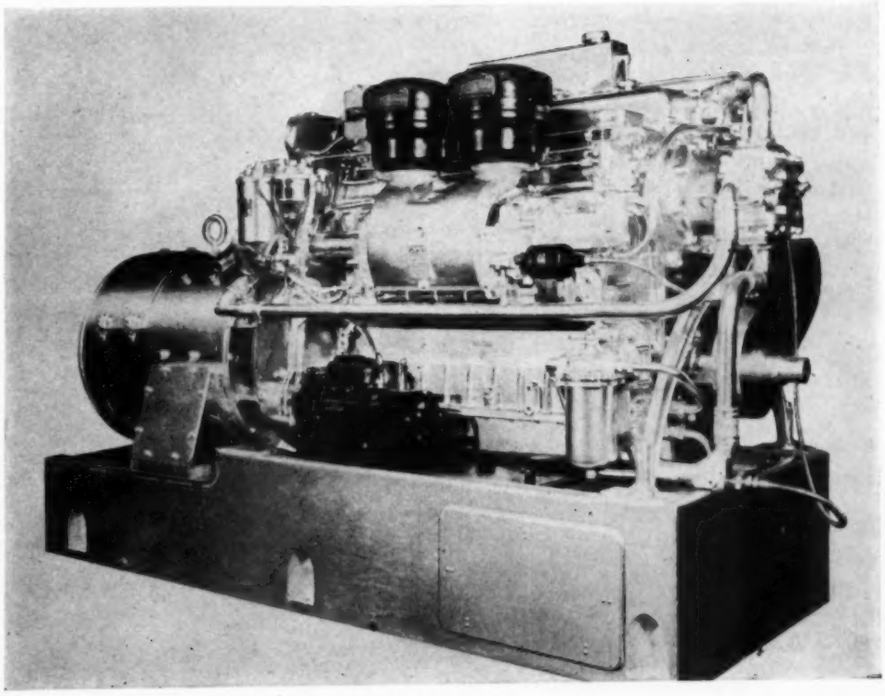
The general arrangement of the dredges is a close parallel to the modern tanker in that the hoppers are 'midships, the bridge and deck personnel quarters in the forward superstructure and the engineer quarters and all victualing facilities aft. Although concentration on space economy was an essential to the arrangement of quarters for a crew totaling 58, liberal provision has been made for crew recreation lounges. The deckhead and side ceiling of the quarters are of incombustible material, neatly worked into panels. The doors are hollow metal and the steel furniture is finished in mahogany.

The auxiliary machinery is electrically operated from the excitation bus of the main switchboard, as well as from two independent 60-kw. Diesel stand-by generator sets. A 10-kw. Diesel set serves for emergency requirements. Throughout the ship construction and machinery outfitting, the full requirements of the Bureau of Marine Inspection and Navigation have been met.



The emergency generating unit is a single-cylinder General Motors Diesel and direct connected generator.

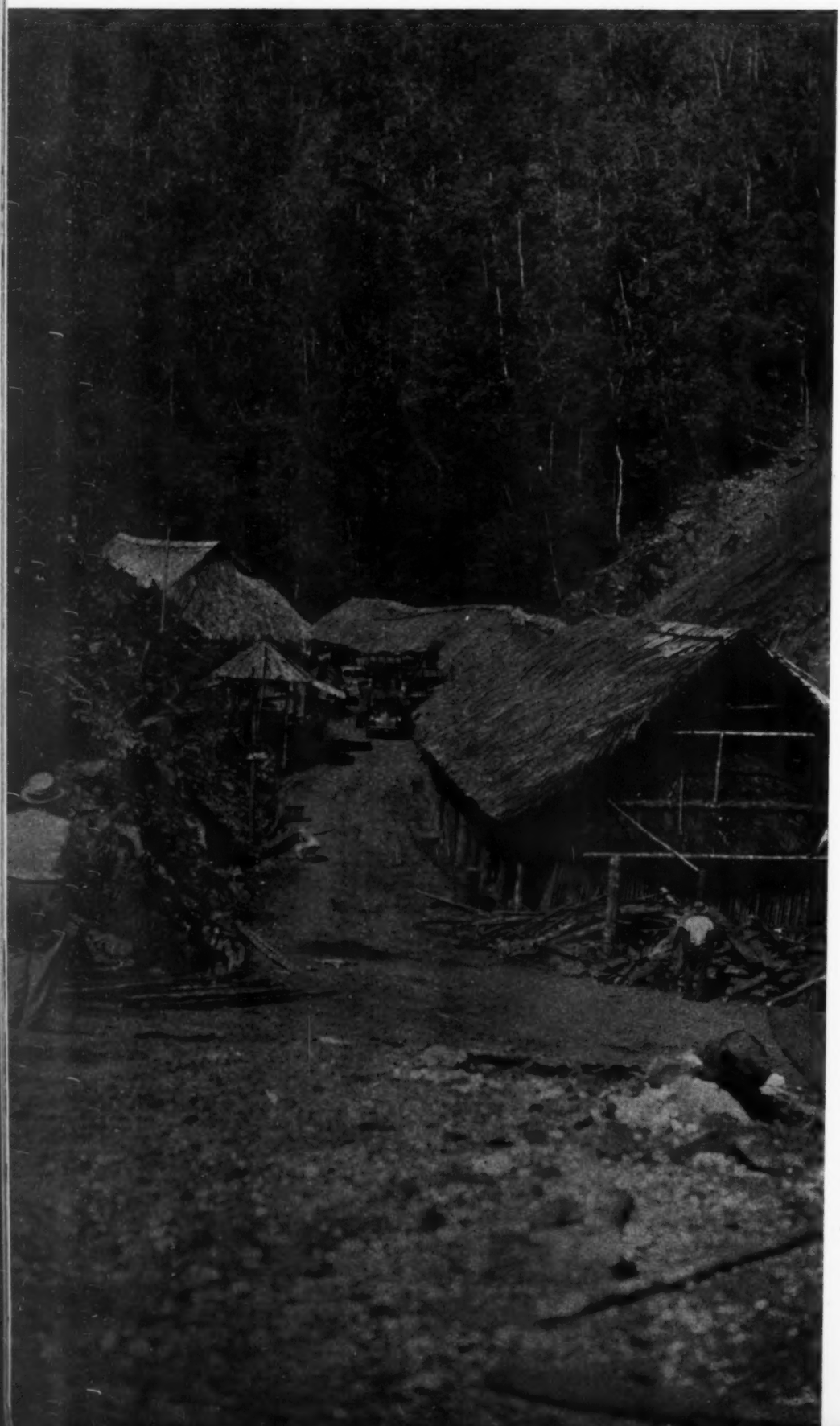
One of two 6-cylinder, 60 kw. General Motors Diesel generating units as installed for standby power service.



Principal particulars of four new ocean-going hopper dredges recently completed by the Dravo Corporation for the United States Army Engineers:

Length, over-all	215 ft. 11 in.
Length, between perpendiculars	212 ft.
Breadth, Moulded	40 ft. 4 in.
Breadth, over-all	53 ft.
Depth, at side, moulded	15 ft. 6 in.
Draft, light	8 ft. 2 in.
Draft, loaded	12 ft. 6 in.
Capacity, cubic yards	700
Capacity, tons	975
Shaft horsepower	1400
Speed, loaded, knots	11.25
Speed, light, knots	13.3

MINING CHROME ORE FOR ESSENTIAL WAR INDUSTRIES



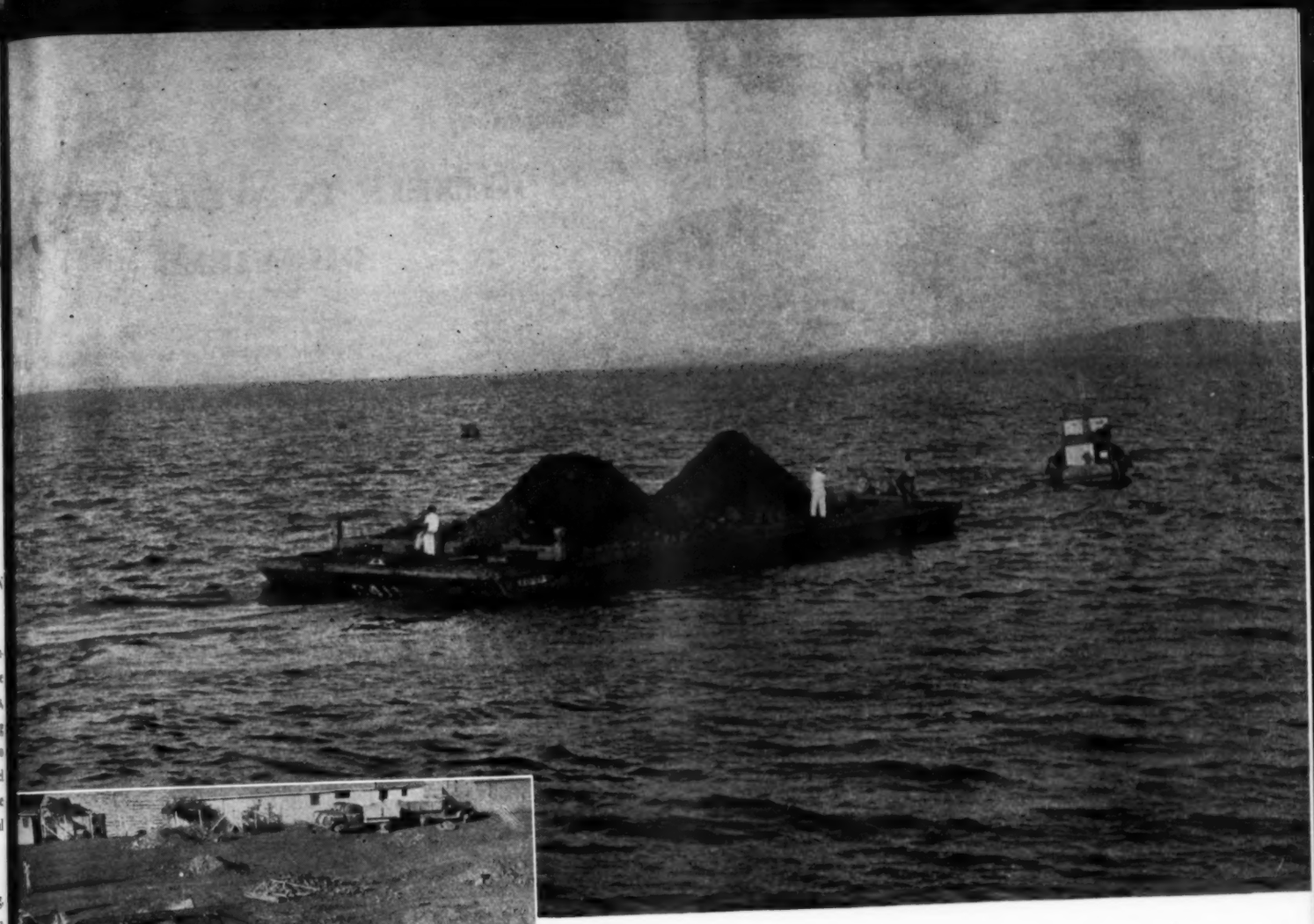
By WILL H. FULLERTON

1900 ft. above the Punto Gorda Moa mining camp, Oriente Province, Cuba, chrome ore destined to be ball bearings, cutting tools, or some other implement of war requiring especially durable metal, begins its journey to the United States where it is alloyed with steel for essential manufacture. But behind these ball bearings or machine tools is a material handling job well worth noting.

Blasted loose and extracted from outcropping, the ore is hand-loaded into trucks, hauled a distance of 50 to 100 feet and dumped into a chute which carries it down the mountainside approximately 200 feet. At this point it is loaded into mine cars and transported by gravity down a slope of 30°, a distance of about 500 feet. Other chutes and mine cars convey the ore to storage bins at the bottom of the nearly half-mile vertical drop.

From the bins, trucks are loaded and the material is transported over the mountainous road a distance of 10 miles to the ore docks. A "Caterpillar" Diesel tractor with Athey Mobi-Loader transfers the ore from stockpiles into trucks after which the ore is weighed and transported a short distance to a barge. From here the ore is taken to ore boats by a small tug. The ore boats are the end of the material handling job in Cuba and the beginning of the transportation job in the U. S. which ends after refining when the finished products are delivered to essential industries for use in manufacture.

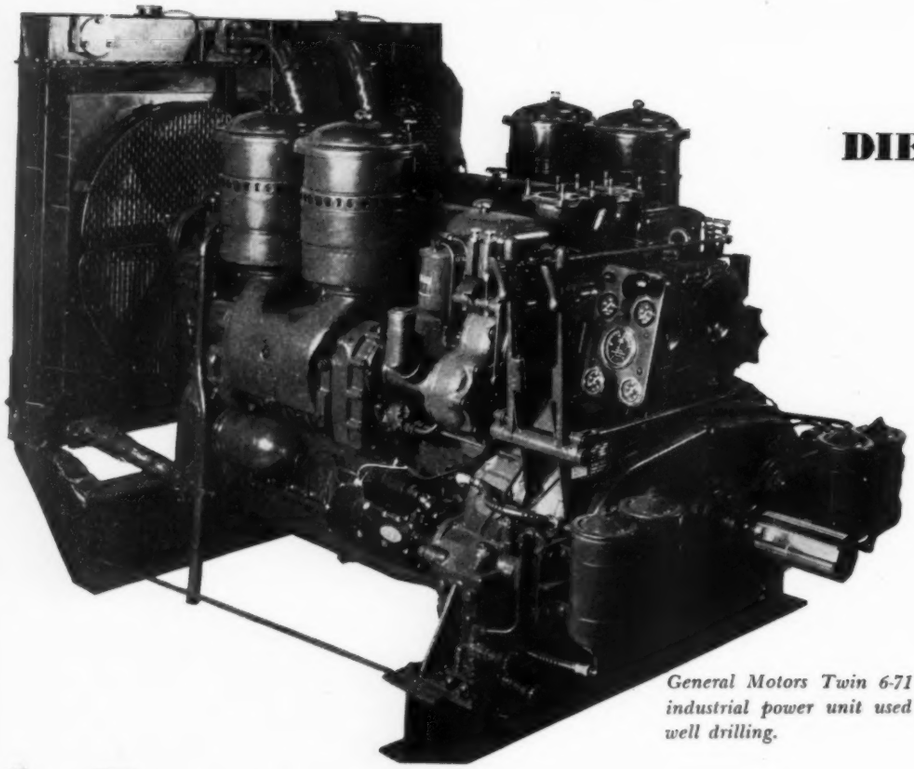
As in 1849 and the years shortly thereafter when discovery of gold brought sudden fortune to some men the growing demand for chrome in peace and war has permitted several fortunes to be made during the time this mine has been in operation.



Top view: Hauling chrome ore from docks at Santiago de Cuba to ore boat. The little tug is powered with a Caterpillar Diesel. Center: Caterpillar Diesel tractor with Athey MobiLoader, loading chrome ore on trucks from dock pile.

Left: View of the Punta Gorda Moa mining camp in Oriente Province, Cuba, situated 1900 ft. below the mine. Right: This long, steep chute speeds the chrome ore on its way from mine to loading dock.

DIESELS IN WEST TEXAS OIL FIELD



General Motors Twin 6-71 Diesel industrial power unit used in oil well drilling.

THE Lee Drilling Company recently completed its first well in west Texas, drilling Stanolind Oil & Gas Company's Bryant Link No. 1 in Andrews County. The company is now drilling a wild cat well northwest of Hobbs, New Mexico. The engines used were two General Motors Twin 6-71 units, rated for continuous service at 270 hp. each. The rig consisted of an Emsco steam drawworks, converted by means of a Lucey reverse countershaft to internal combustion engine drives. This drawworks embodies only one rotary table speed, which imposes severe operating conditions on the engines, as all rotary table speed variations can be made only by changing engine speeds. This limitation of the steam drawworks provided ample demonstration that Diesel engines will operate satisfactorily over an extremely wide range of speeds. The two General Motors units were compounded by means of "V" belt drives, so that one engine could drive the drawworks and rotary table, and one engine could drive the mud pump; or, they could be compounded for hoisting. A 7¼ in. x 18 in. "Oilwell" mud pump and a 21 in. "Oilwell" rotary table completed the major items of equipment.

Each General Motors 6-71 Twin unit consists of two, six-cylinder 4¼ in. x 5 in. two-cycle engines, mounted together on a gear box, whose output shaft has a speed of 900 rpm. at 1600 rpm. engine speed. The engines are so designed that they can be assembled into a very compact, light-weight unit, with all working parts and accessories on the outside of the unit where they can be easily inspected or adjusted when necessary. The weight of each 6-71 Twin unit, rated for continuous service at 260 hp. at 1600 rpm,. is only 5,300 pounds, or less than 20 lbs. per hp., continuous rating.

General Motors unit type injectors are used in these engines. These injectors, which also meter the fuel, fit in the cylinder head of the engine and can be removed quickly and replaced as a unit when necessary. No separate fuel injection pump is required. as these unit injectors both meter the fuel and inject the fuel into the combustion chamber at the proper time in the cycle.

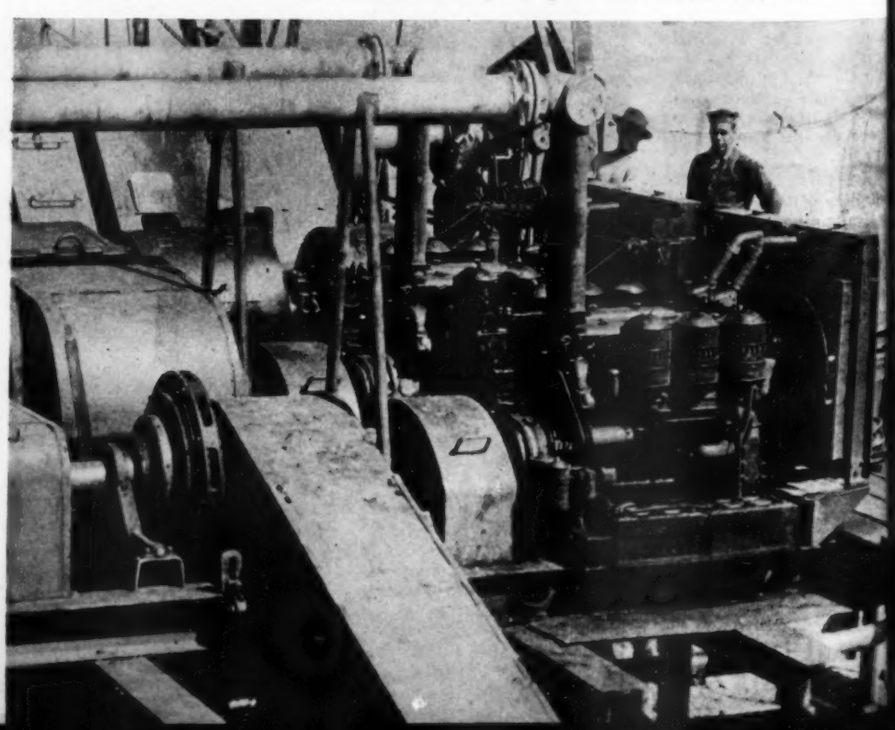
The exhaust gases are scavenged by a change of air which is forced into the cylinder by means of a Roots type blower. This air thoroughly sweeps out all burnt gases through two exhaust valves located in the cylinder head, and helps cool the internal parts of the engine, especially the exhaust valves. At the beginning of the compression stroke, therefore, each cylinder is filled with fresh clean air, which insures highly efficient combustion.

The driller controls engine speed by means of a hand throttle wheel conveniently located. The engines are protected by an overspeed governor.

In drilling Bryant Link No. 1, the Lee Drilling Company encountered considerable trouble with a new string of drill pipe. This trouble resulted in fifteen fishing jobs before the well was completed. Following are some of the statistics on the well:

Oil company—Stanolind Oil & Gas Company
Contractor—Lee Drilling Company, Tulsa, Oklahoma
Location—Bryant Link No. 1, Andrews County, Texas
Total depth—7,187 feet
Total hours, each engine—1,861
Total fuel used—18,973 gallons
Total lube oil used—161 gallons
Number of fishing jobs—15
Number of rock bits used—54
Casing schedule—12⅜ in.—250 ft.; 8⅝ in.—4,000 ft.; 5½ in.—6,830 ft.

Two General Motors Twin 6-71 Diesel units operating in the West Texas oil fields.



NEW MANEUVERABILITY FOR HARBOR TUGS

By WILL H. FULLERTON

OF all the craft engaged in the marine field the tug or towboat—by the very nature of its work—demands the greatest maneuverability. Hardly a day goes by when the log of a harbor tug fails to show either the moving of a dredge or derrick, the towing of a barge or lighter, the docking or undocking of a huge liner, anyone of the myriads of harbor chores—all take skill, power, and maneuverability; all are extremely important to the progress of marine commerce. Without these workhorses of the harbor, commerce would soon be at a standstill.

Conversely, it is likewise axiomatic that by giving harbor tugs more maneuverability the entire industry will benefit by this progressive stride. More maneuverability is what the new *Harbormaster* tug offers. Here are the plans for a harbor tug that has maximum maneuverability—360° propeller thrust steering. Here is a tug that can be handled in any water comparably to a small boy in a rowboat equipped with sport-type outboard.

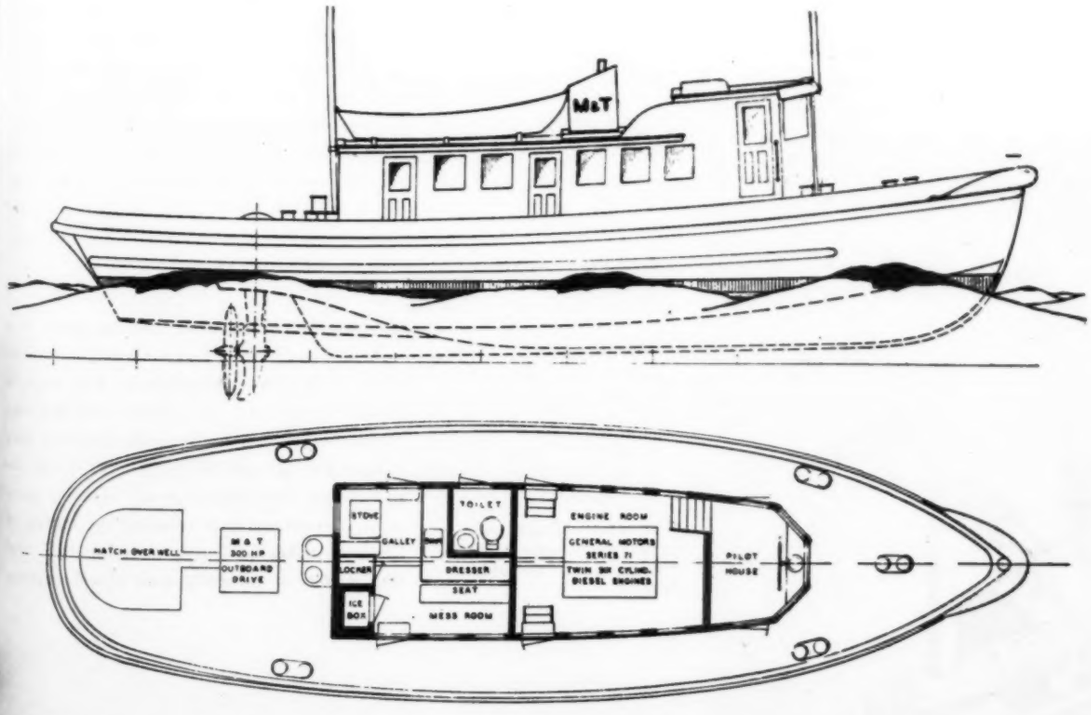
This new revolutionary development is made possible by the application of the patented Murray & Tregurtha outboard drive which steers by the thrust of the propeller itself and allows the propeller to be turned in any direction desired—even the full cycle of 360°. Thus, the helmsman is no longer limited by the conventional rudder which at the most only controls up to 180°. Steering with full power, such as the *Harbormaster* tug allows, is positive maneuverability, the safest and most economical method. More than that, this steering agility carries along with it one of the supreme requisites of harbor work, namely, the ability to produce full speed astern! Heretofore, this has been but the command due to gear ratio and the ensuing loss in power! Not so with this newly designed tug for there is no reversal of gears—simply the turning of the wheel 180° from normal forward position, until the propeller thrust is directly toward the bow, apply full speed and you have full speed astern.

The initial *Harbormaster* tug is designed for twin six-cylinder General Motors, Detroit Diesel Engine Division, Series 6-71 Diesel engines developing 300 hp. Both greater and less powered tugs with larger and smaller hulls are off the designing boards—all equipped with Murray & Tregurtha outboard drive.

There are other features, also beneficial to harbormen. One of these is the 180° elevating mechanism. In the accompanying diagram, note the hatch-covered well immediately aft of the outboard drive. The operation of the 180° elevating mechanism means that from his stand at the wheel, the helmsman can elevate the entire vertical assembly, upward and backward, to any degree he desires—through the wheel and directly overhead to 180°, if necessary.

This agility means a drastic cut in maintenance costs. It also means a vast increase in operating time because it will no longer be necessary to dry-dock for repairs to the propulsion and steering apparatus. By elevating the submerged assembly through the well to deck level or higher, every part is easily accessible.

Present day harbor tugs are limited in their scope of work. By that we mean that even in these modern times of deep harbors and constant dredging, there are many areas where the tug dare not enter. This may be due to shallow water or to the possibility of striking submerged obstacles or reefs. This limitation is greatly reduced, or should we say that the potential working area of the *Harbormaster* tug is greatly expanded—limited only to the draft of the hull itself, which in this case is only 4.25 ft. Although the propeller juts down below the keel, by using the 180° elevating mechanism, the operator can angle the entire vertical assembly to say 20°, or 30°, 35°, even to 45°, retaining forward power and control. Should the submerged section strike bottom or any underwater obstacle of sufficient size as to cause damage, the outboard drive is equipped with a shear pin which will automatically shear off, allowing the vertical shaft to ride up and backward, over the obstruction. And, this agility is harmlessly achieved without the loss of forward motion, because in a minute a new shear pin can be inserted without even throwing it out of gear.



Outboard profile and plan view of "Harbormaster" tug with Murray & Tregurtha outboard propulsion unit and General Motors Series 71 twin Diesels.

PROGRESS IN NOZZLE TESTING

RECENTLY there has been much publicity on the subject of Diesel engine nozzle testing. Articles explaining the need for such testing have appeared in many trade publications. Every Diesel school operated by the Armed Services has incorporated this subject in their curriculums.

There is nothing significant about this activity; it is only an evidence of progress. For the first few years after the advent of Diesels in the power field, the economies of operation were so apparent, and the consistency of function so evident, few persons made further attempts at economies. With further refinements in Diesel designs and the increases in speeds and horsepower, changes in fuel injection systems were made. This resulted in finer fuel injection mechanisms and the need for maintenance of specific fuel injection pressures.

These more mechanically intricate injection units were still exposed to the same deteriorating factors that their cruder and more rugged predecessors had contended with. Heat problems were alleviated in the more modern engines, but high temperatures were still present. The four enemies of fuel nozzles are heat, fuel acids, dirt and salt water. These foes can be guarded against but many factors enter into the procurement, storage, and handling of Diesel fuels and there always remains the human element and its tendency to overload and over speed any piece of machinery.

Any of these factors may and can cause partial or complete nozzle failures in a very short time. Nozzle openings become wholly or partially clogged by dirt or carbon. They can also become enlarged or distorted by corrosive action.

The spray pattern becomes imperfect and the injection pressures effected as a result of these deteriorations and the efficiency of the engine is consequently effected. Regular maintenance and testing procedures at definite periods are the only insurance for perfect function.

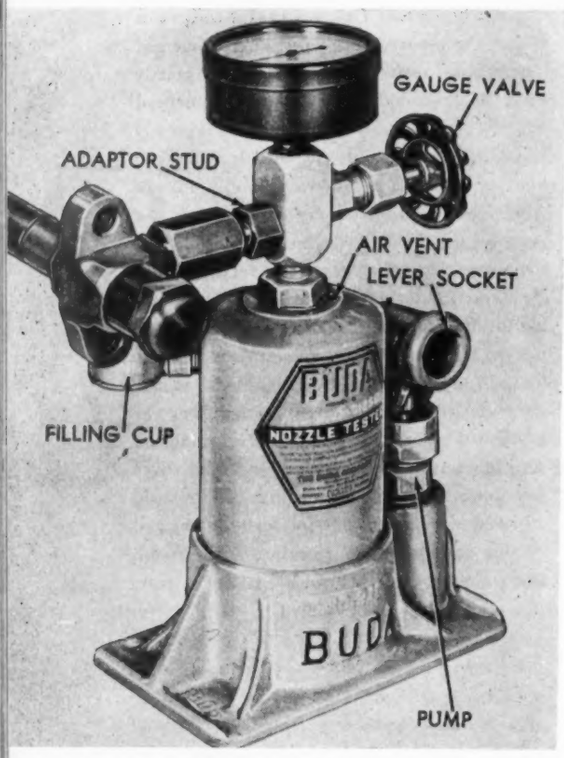
Careful owners and operators were aware of the terrific "beatings" these units suffered in the course of normal operation and took steps to avoid the deterioration that was bound to take place if they were neglected indefinitely.

They also realized that by following a consistent policy of simple maintenance of the injectors on their engines that they not only decreased operation costs and maintained full efficiency, but that they also avoided the costly breakdowns and lost operating time they possibly would incur by permitting complete nozzle failures.

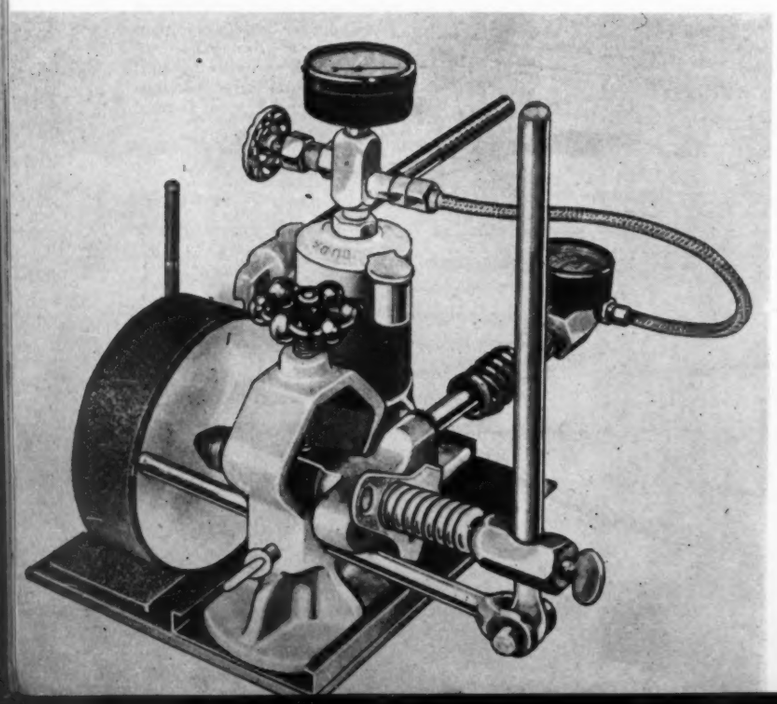
There still remained the factor of improper or makeshift testing equipment and in the past there has been little attempt made to meet the need for such equipment for Diesel engines except where a few engine and nozzle makers have produced specialized items to meet the needs of their own products. Restriction of adaptability has been the principal factor that reacted against the broader use of nozzle testers. Until now there has been no nozzle and injector tester available that embodied the features of universal application—portability, and low cost.

The Buda Company has met this need with a low-priced, portable, piece of equipment that is not only within the price range of the owner of a single engine, but is sufficiently broad in its application to meet the needs of the owners of various makes of Diesel engines or the Diesel engine service station. The Buda tester is universal in application and is capable of and adaptable to the testing of any make or model of open, semi-open, or spring loaded closed nozzle, as well as the mechanically operated unit injectors.

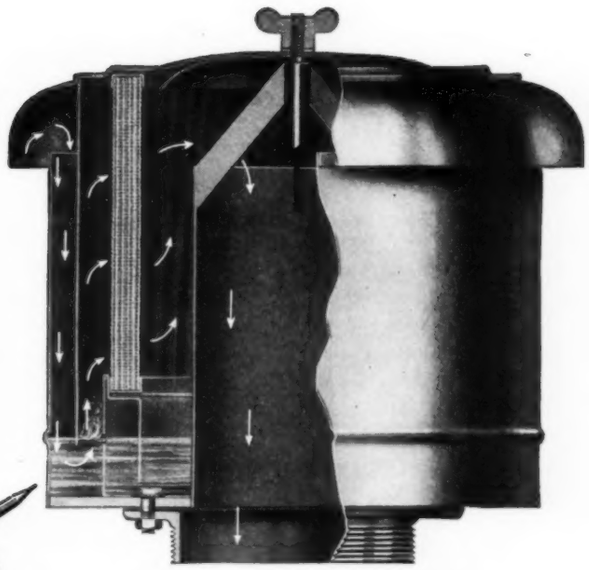
Accompanying each tester sold by Buda is a manual covering all phases of nozzle and injector failure and maintenance. This book is profusely illustrated with pictures and drawings showing the characteristics and adjustment procedures for all types of Diesel nozzles and injectors and their correct nozzle opening pressures. It contains data covering the testing of fifty-one makes and over two hundred and fifty models of currently used Diesel engines.



Buda universal nozzle tester with an injector in place for testing.



View of the Buda universal nozzle tester assembled on portable base.



Oil Bath Filter
Patented

Air Filter QUIZ

1. HOW HIGH IS THE DUST ARRESTMENT? Practically all popular filters for air intakes of engines, compressors and blowers have efficiencies ranging between 95% and 99%. But there are other important considerations in the selection of an air filter.

2. IS IT ALL METAL? All metal filters resist deterioration. Air-Maze all metal filters use a media of crimped metal screen mesh which does not "pack down", and density of media is the same throughout every square inch of filter surface. Metal filters are better able to withstand engine backfires.

3. DOES IT OPERATE ON THE VISCOUS-IMPINGEMENT PRINCIPLE? Air-Maze Filters do. They permit large air flow in small space and are not affected by moisture or oil-laden air.

4. IS IT AN OIL BATH TYPE? Most industrial applications demand the greater dirt-holding capacity and less frequent service of an oil bath filter. Air-Maze Oil Bath Filters vary in size from breather filters to large industrial units.

5. DOES IT HAVE LOW RESISTANCE TO AIR-FLOW? The advantage of low pressure drop is obvious. Because of the cylindrical design of Air-Maze Filters, the average drop in oil-wetted types is less than ⅛" w.g.; in oil bath types, less than 2" w.g.

6. CAN THE FILTER BE DISASSEMBLED AND CLEANED? A simple servicing operation restores oil-wetted filters to their original efficiency. The continuous washing action in oil bath filters keeps the filtering media clean and efficient. Air-Maze Oil Bath Filters are designed so that they can be easily and quickly disassembled and cleaned when necessary.

★ ★ ★

You get engineered filtration in every Air-Maze Filter. More than 3,000 Air-Maze products assure proper selection of the filter for special application. Your Air-Maze representative will recommend the best filter for your needs. Air-Maze Corporation, Cleveland 5, Ohio. Representatives in principal cities. In Canada: Williams & Wilson, Ltd., Montreal, Quebec, Toronto, Windsor; Fleck Bros., Ltd., Vancouver.

INSPECTION AND OVERHAULING OF DIESEL UNITS
PART I

Conducted by R. L. GREGORY*

EVERY supervisor and engineer connected with Diesel engine operation is aware of the value and necessity of periodical inspection and overhauling. Such an inspection and overhauling can be carried on in two ways, a haphazard or catch as catch can method, or a well planned and prepared method. Many conditions beyond their control, such as increased load demand, labor shortage, inability to obtain replacement parts, etc., have forced many engineers to make a sort of catch as catch can overhaul job of his units, during the past few years.

Consequently this forced method of inspection and maintenance has not resulted in satisfactory upkeep and operation as far as the present condition of many units is concerned, and many supervisors and engineers are now beginning to wonder just how long their units will continue to function without a "major operation." The writer recalls many conditions, that were found by him in his work as a service and erecting engineer, in plants after World War I. Much of the equipment which needed inspection and overhauling was found to be in a deplorable state of neglect, yet in the majority of cases, those in charge were not at fault. The condition was due to factors beyond their control, since they could not follow their usual well laid out plans of inspection and maintenance.

Many plants today are in somewhat similar condition, due to long hours of service and lack of outage time. However so much more has been dependent upon our present day plants, facilities for maintenance and repair have been so much better organized since supervisors and manufacturers alike have recognized the fact that units must be kept in operation and being forewarned have been forarmed. Present economic conditions and trends point to an early release of many materials and parts sorely needed by plants in the revamping and overhauling of units. We are entering the conversion period and gradually our efforts will turn from war materials to the making of appliances, vehicles, and other necessities used in normal peacetime pursuits. Now is the time to plan for the future, so that when the go-ahead sign is given to industry you will not be caught with the proverbial "Untrimmed and Unfilled Lamp."

With this in mind, it is the purpose of this article, and others to follow, to outline and discuss, just what constitutes a well planned and carried out inspection and overhaul job on a Diesel unit, or any other piece of major power equipment. When the job is finished those in charge should have all the information desired on that unit, its actual pre-inspection condition, its final condition after overhauling and being again in service, the cost of time and material for that overhauling, and a basis to work on for future similar jobs.

On a large scale inspection and overhaul job, much more must be taken into consideration than the mere performance of the work itself. Thoughtful planning and preparation can cut costs and outage time, both of which are vital factors in any overhaul job. When any such job is to be carried out the first item to be given consideration is to give that job an identification or job number, to which all time and material used on the job is to be charged.

Many plants even go farther than that and start the job only after a carefully planned estimate of the costs has been worked up and approved. However such concerns usually employ engineers with consulting experience, thoroughly familiar with labor and material costs, and any repair job or new construction is budgeted and handled in this manner. However this is a little complicated in the average plant and that is the sort of plant we are considering.

With the overhaul job given an identification or job number, the next step is to make up a carefully planned schedule of work to be done. As an illustration of this schedule let me just give you a typical list as prepared for a six cylinder, crosshead type, air injection unit, which would be somewhat as follows:

Work to be done on overhaul of "A" unit—Job No. A-100-1.

1. Remove all cylinder heads and accessory piping such as fuel lines, air lines and cooling agent lines. Inspect these heads for corrosion, cracks or any other defects.
2. Remove the fuel injection equipment, needle valves, check valves, atomizers, etc. and check for wear or other defects.
3. Pull pistons, check rings, ring grooves, heads, cooling apparatus, clean thoroughly and replace defective parts.
4. Inspect and clean liners, ports, lubricating oil-ports, and "mike" for wear. These readings should be checked against those taken on the previous inspection to determine the amount of wear which has occurred since the last inspection. The difference to be divided by the number of thousand hours operation since the last inspection will give the liner wear per thousand hours operation since the last inspection.
5. Inspect the liner at top piston stroke to see whether any excessive shoulder has developed at this point. If so it should be removed by grinding with a portable grinder and then honed with a good stone. Also remove any sharp corners at the ports, which might have a tendency to break rings.
6. Inspect all bearings, both rod and mains, crosshead pins, guides, and rod bolts for excessive wear. Keep a record of these tolerances for comparison with last inspection and if found excessive to good operation make the necessary repairs.
7. Inspect all starting valves and mechanism.
8. Remove and clean, then inspect wiper ring assemblies and oil catchers.
9. Remove and test cooling coils and air coils in heat exchanger.
10. Remove, clean and inspect all fuel pumps and fuel pump check valves and all auxiliary parts. (This is very vital since these parts have and are taking a lot of grief with some present day fuels.)
11. Remove, clean and inspect all regulating valves, air and blast governors.
12. Inspect and clean all scavenging air equipment. This includes compressor, scaveng-

. . . . *And now please turn to page 120* . . . .

* *Chief Engineer, Municipal Water and Light Plant, Hillsdale, Michigan.*

Exchange Your Diesel Maintenance Ideas

"Advantages of a Systematic Maintenance Schedule"

Conducted by R. L. GREGORY

Editor's Note: In this department we provide a meeting place where Diesel and Gas engine operators may exchange mutually helpful maintenance experiences to keep our engines in top condition. Mr. Gregory edits your material and adds constructive suggestions from his own wide experience. This is your department—mail your contributions direct to DIESEL PROGRESS.

THE following letter on maintenance has been received by this department from P. R. Baar, Superintendent of the Zeeland, Michigan Municipal Diesel plant:

"At the time that I took over the management of the local municipal plant, maintenance was quite a problem, as no systematic maintenance plan had ever been carried out. We have four Fairbanks-Morse Diesels, two of which are rated at 690 bhp., and two at 375 bhp. The units had been operated on no fixed schedule, operating until something went wrong, then shut down and another unit started up. In other words maintenance had been on a sort of hit and miss arrangement.

"Upon taking the plant over, one of the first things put in force was a systematic maintenance and operation schedule. When I made up this schedule and showed it to the plant foreman, he said, 'Hell, that means a lot of extra work.' That statement was true but we tried it out, using the following plan.

"Our peak load runs around 760 to 780 kw. with a total generation of from 10,000 to 12,000 kwh. every twenty-four hours. Therefore by operating one of the larger units with one of the smaller units, keeping the other large unit in reserve, we were able to give the other small unit a general overhauling. Upon completion of the work on this one, we kept it in reserve and overhauled the other large unit. With these two in condition, they were operated on load and the other two overhauled in the same manner. Once all four units were in good condition, regular maintenance schedules were adopted with outage for each unit arranged periodically.

"We remove the inspection plates, check bearings, cotter keys, tightness of bolts and nuts and all parts of the unit which need attention. I will say that it was surprising to me the first time these units were overhauled to find the number of loose nuts, cotter keys missing and many other details too numerous to mention, which required attention from lack of proper maintenance. Our operating schedule now calls for two weeks operation of a unit, then two weeks outage for general checkup if found necessary. Every four weeks we remove the injection equipment, clean and inspect it and replace it in first class condition. The exhaust ports are cleaned and the cooling system gone over, in fact all available parts, not requiring a general dismantling of the unit are given attention.

"As a result of this systematic operating and maintenance program, our costs have been lowered, our efficiency raised (we now get around 12.5 kwh. per gallon of fuel consumed), and the whole operating and maintenance setup has materially improved. The foreman, operators and maintenance men have realized the value of this program and are now for it one hundred per cent. While it did mean a great deal more work for the crew on the start, the program is now paying dividends and the boys are all for it."

The foregoing is the experience as Mr. Baar has related of the Zeeland plant, a plant which is typical of many small municipalities throughout the country. Zeeland has a population of about 3,000 people, all of whose electrical needs are furnished by their municipal plant, which is modern in every respect. While it is a small plant, their problems in proportion to their load demand and equipment, are the same as those of larger Diesel plants, and Mr. Baar is well aware of the advantages to be gained by such a systematic program. With a limited amount of income from plant output, any savings that can be made on maintenance, is just that much "velvet" so to speak, and while Mr. Baar did not mention the fact in his letter, the writer is aware that he has made some improvements to the plan through the purchase of additional equipment, such as fuel filters, etc., all of which will have a tendency to improve operation and lower maintenance costs.

It is rather difficult to understand the attitude of some engineers and maintetance men toward a program of systematic maintenance and operation. While the great majority of men connected with Diesel operation fully realize the value of good maintenance properly carried out, there are still some of the fraternity who still hang to the idea of letting equipment run until it falls apart and maintenance is forced upon them.

Some plants even go further with their maintenance programs, and each month set aside a sum from their earnings to build up a plant maintenance reserve or a reserve which is to be used only for plant expansion. The amount which can be so applied is determined not only by income, but more particularly by plant costs, and any savings made by systematic operation and maintenance programs, means that much larger percentage which can be allocated to such a fund.

High Speed Diesel Maintenance and Lubrication

For best performance the operator of a high speed Diesel should, (1) select a fuel having as good burning qualities as economic considerations permit; (2) operate the engine hot enough to burn the fuel properly; (3) maintain the fuel injection system so that good combustion is assured, and (4) use a lubricating oil which will withstand the high temperatures and soot contamination.

To meet this latter condition, heavy duty oils have been developed by the petroleum industry with the cooperation of the engine builders. The development of these oils is covered fully in the preceding issue of this magazine. In varying degrees, the heavy duty oils have these characteristics:

1. resistance to the oxidizing effect of high temperatures.
2. strong cleansing or detergent action.
3. high film strength to reduce wear.
4. ability to protect bearings against corrosion.

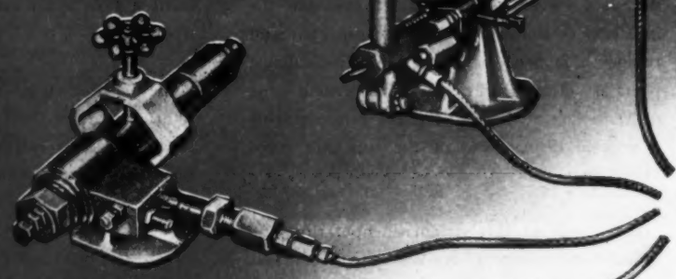
—From Texas Company's "Lubrication."

BUY MORE BONDS

BUDA

Universal Diesel Nozzle Tester

Complete nozzle testing unit for General Motors.



Hookup for testing heavy Standard, Caterpillar and International Nozzles.

Testing Fulton, Fairbanks-Morse and Baldwin-De la Vergne Nozzles.

A complete BUDA set, including equipment necessary for testing all popular makes of nozzles and injectors.

Testing back pressure valve on a Cummins Injector.

BUDA Model B Nozzle Tester. Available with 3,000 or 5,000 lb. p.s.i. gauge.

Tests all nozzles and injectors— Right at the Engine!..

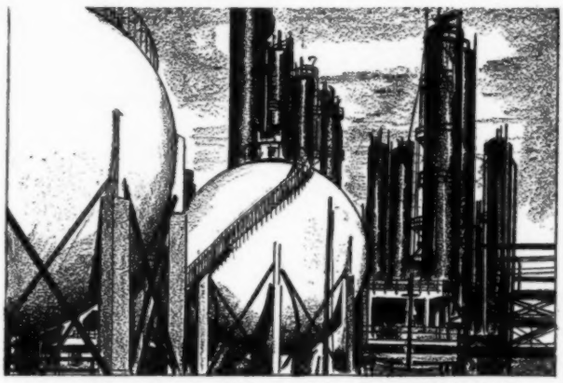
The BUDA Universal Diesel Nozzle Tester is a versatile instrument designed to test all popular makes of nozzles and injectors right at the engine. Any mechanic can quickly measure injector pressures with the BUDA Nozzle Tester . . . test for leaky valves — spray patterns — dribbling nozzles — sticking needle valves, etc. No outside equipment is necessary. Write or wire today for details.

BUDA

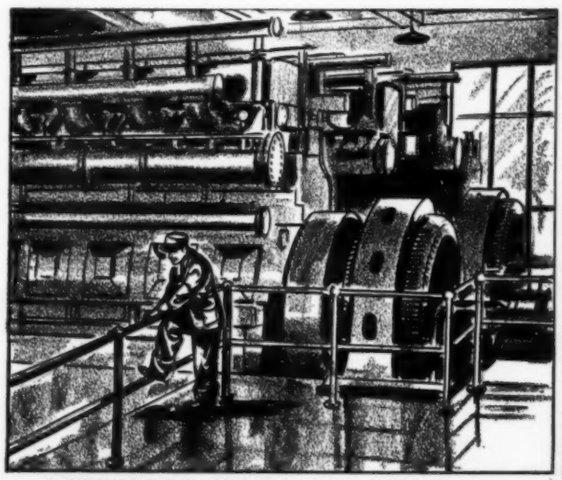
15402 Commercial Ave.
HARVEY (Chicago Suburb) **ILLINOIS**

Do you know that . . .

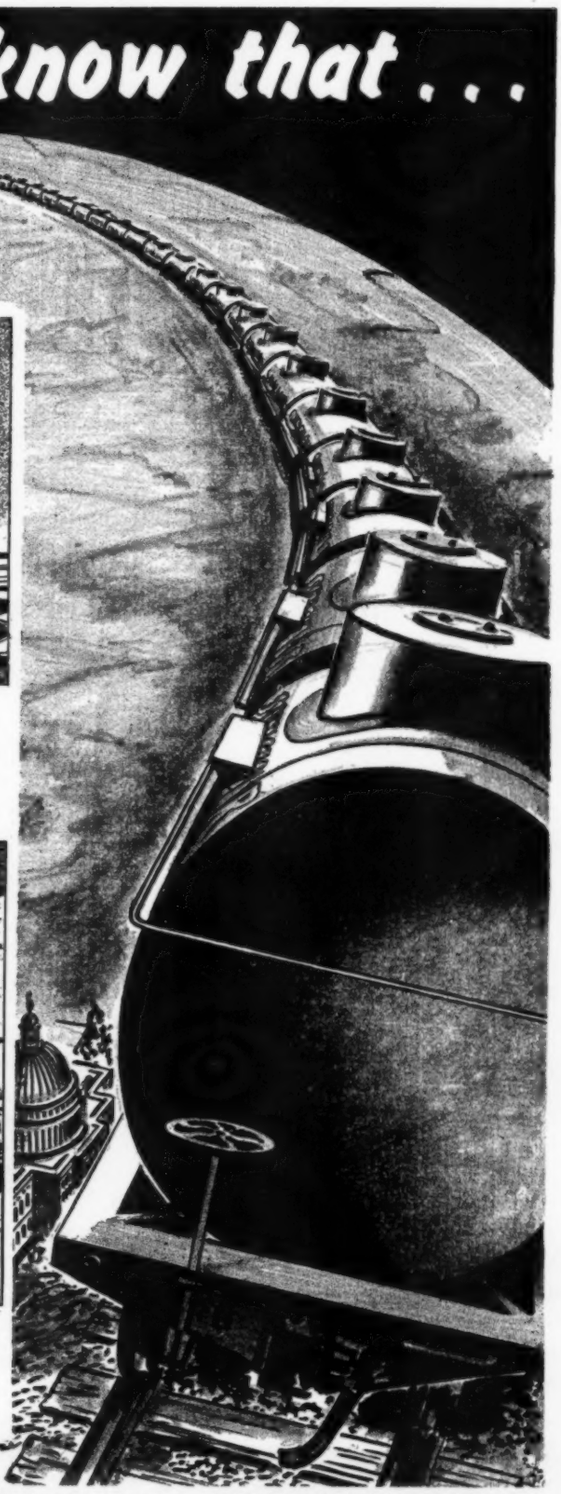
A TANK CAR TRAIN STRETCHING FROM WASHINGTON TO QUEBEC WOULD BE REQUIRED TO CONTAIN A SINGLE YEAR'S PRODUCTION OF CRUDE OIL FROM SINCLAIR'S 8000 WELLS.



SINCLAIR RUBBER INC., A SINCLAIR SUBSIDIARY, MANUFACTURED IN ONE YEAR SUFFICIENT BASIC MATERIAL TO PRODUCE 78,000 TONS OF SYNTHETIC RUBBER. THIS PLANT AT HOUSTON, TEX., IS SINCLAIR OPERATED FOR THE GOVERNMENT.



A CLEANER DIESEL ENGINE IS MADE POSSIBLE BY THE DETERGENT CHARACTERISTICS OF SINCLAIR TEN-OL. THIS IS ONE OF SEVERAL SINCLAIR OILS PREPARED SPECIFICALLY FOR BETTER DIESEL LUBRICATION.



SINCLAIR IS EQUIPPED TO SERVE YOU BETTER!

FOR FULL INFORMATION OR LUBRICATION COUNSEL WRITE SINCLAIR REFINING COMPANY, 630 FIFTH AVENUE, NEW YORK 20, N. Y

ADECO
FUEL INJECTORS
ADECO
Write for these
GUIDES TO DEPENDABLE
FUEL INJECTION EQUIPMENT
by ADECO
Adeco
NOZZLE TESTER
• Adeco Model PV—covers single unit fuel injection pumps with plunger diameters from 20 to 31 mm.
• Adeco Model P—covers single unit fuel injection pumps in a range from 7 mm to 22 mm plunger diameters.
• Adeco Fuel Injectors—presents the complete line of Adeco standard injectors and nozzle holders, including water-cooled type.
• Adeco Nozzle Tester—brings the complete story on this widely-used portable equipment for testing fuel injectors and hydraulic devices.

If you do not already have these helpful bulletins on Adeco fuel injection equipment, you can get them for the asking. The informative bulletins listed here present details on today's line of Adeco fuel injection pumps, nozzles, nozzle holders and nozzle testers.

Write for them by name, or if you prefer, ask for complete catalog.

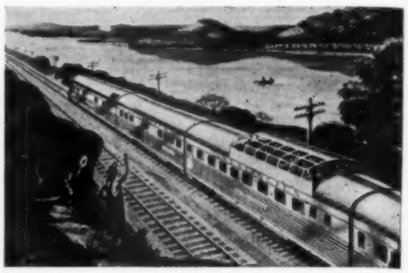
ADECO

AIRCRAFT & DIESEL EQUIPMENT CORP.

4401 NO. RAVENSWOOD AVE. • CHICAGO 40, ILLINOIS

New "Vista Dome" Car For Burlington Lines

A SENSATIONAL innovation in railroad travel, a streamline car with a glass-enclosed dome from which passengers can enjoy a complete and unobstructed panorama of the passing scenery, will be placed in service on the Burlington Lines next month.



View showing the new "Penthouse" car in a Burlington Diesel "Zephyr" train.

The unique car, which the Burlington calls the "Vista Dome," has a raised compartment, built into the roof, the top and sides of which are laminated, heat and ray resisting glass. This, air-conditioned "pent-house" which is reached by a short stairway from the main floor, contains 24 deep-cushioned seats where passengers, with heads and shoulders well above the train's roof line, may ride in luxurious comfort while enjoying a view forward and upward as well as to the sides and rear.

The car, which has been created from one of the Burlington's stainless steel, Zephyr-type coaches during the course of routine wartime reconditioning, embodies the outstanding feature of the startling "Astra-Liner" designs recently conceived by Electro Motive Division of General Motors. The addition of the "Vista Dome" increases the seating capacity from 52 to 58 passengers.

From the air-conditioned glass-enclosed dome passengers have unobstructed view of the countryside.

Commencing next month, the "Vista Dome" car will be operated in regular service on crack trains on various parts of the Burlington system. If travelers are as enthusiastic about

. . . . *And now please turn to page 90* . . . .

Pounds... or Tons

PIERCE GOVERNORS MATCH THE POWER TO THE LOAD

● The governor has to be completely dependable if high efficiency is to be gained in the operation of a crane or shovel. Constant engine speed must be held—despite the fact that the load is varying continually—and widely.

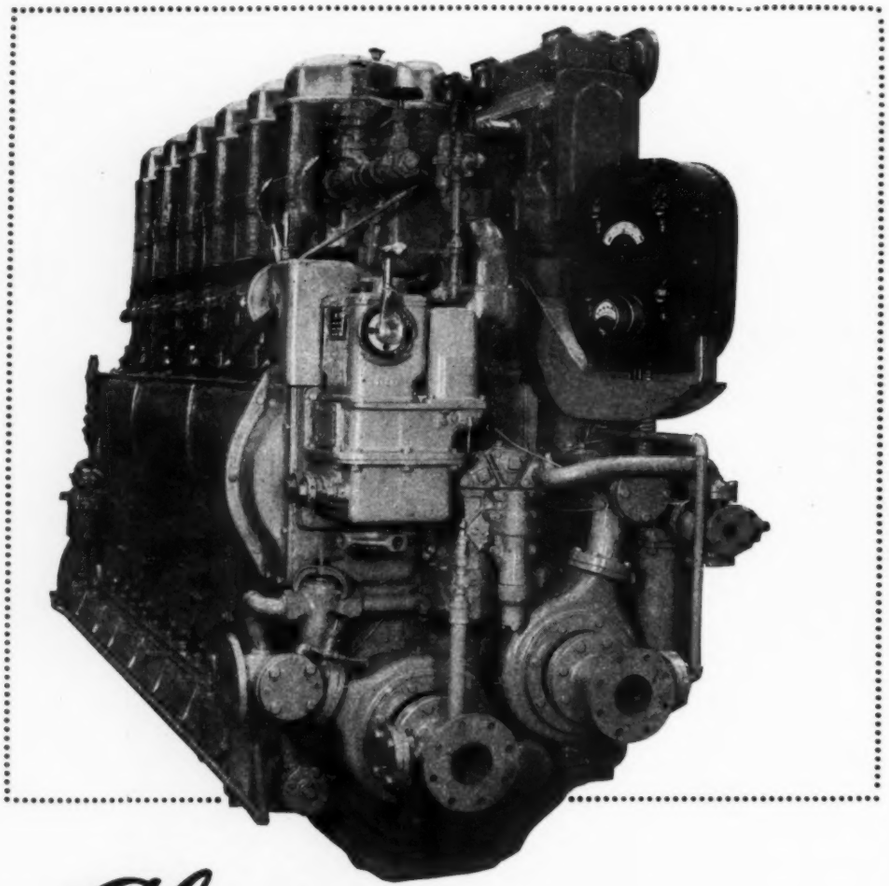
Pierce Governors provide unfailing, positive regulation—whether the load is the boom alone—or tons of weight to be moved. This is the kind of governing that has made Pierce Flyball Governors standard equipment on many of the world's foremost diesel engines.

Pierce Governors for diesel engines are available in two varieties—driving directly from the fuel pump—or independently of the fuel pump shaft. These sensitive, dependable governors need little attention—often give trouble-free service far longer than the engines themselves.

Write for the Pierce catalog and full particulars if your engines are not now Pierce-equipped. Specify Pierce Governors for the new engines you buy.

THE PIERCE GOVERNOR COMPANY, INC.
1603 OHIO AVENUE • ANDERSON, INDIANA
Manufacturers of
Pierce Precision Governors and Sisson Automatic Chokes

PIERCE GOVERNORS



Alnor Pyrometers

Especially important with supercharged power

High-powered Enterprise Diesels of the turbo-charged type are equipped with Alnor Exhaust Pyrometers, providing a reliable check on operating temperatures. With these engines the inlet and outlet temperatures of the exhaust gas turbo-blower are of equal importance with cylinder exhaust temperatures. Alnor Exhaust Pyrometers provide for a simple, convenient installation and assure reliable temperature indications. These temperatures are of great importance as a guide to uniform loading and continued high efficiency performance of the engine.

There is an Alnor Pyrometer to meet the needs of any type of engine, large or small. Write for bulletins with complete descriptions.

ILLINOIS TESTING LABORATORIES, INC.
420 North La Salle Street
Chicago 10, Illinois

"Vista Dome," *continued from page 86*

the car as anticipated, President Ralph Budd of the Burlington has stated the railroad will have a fleet of such cars in the future for use on its scenic runs. The postwar cars will include a multitude of improvements and innovations which wartime conditions have made it impossible to include in the preliminary model.

The Burlington also disclosed that already ideas for even finer cars of this type have come from the drawing boards of General Motors engineers, to be processed when new passenger car construction is possible. Preliminary plans provide for multiple-level sleeping and lounge cars, as well as coaches, affording full headroom on all levels.

Third "E" Award To Candler-Hill

CANDLER-HILL Corporation, Detroit, recently received its third Army-Navy Production Award. The coveted "E" award was originally conferred in November, 1943. Two stars now grace the flag flying above this division of The Titan Pump and Engineering Corporation.

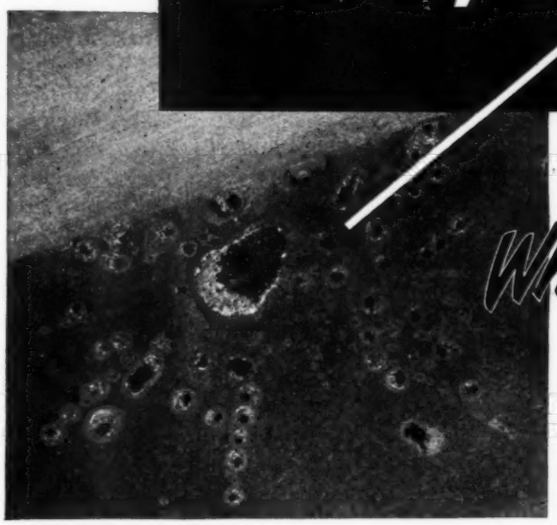
Months before Pearl Harbor, Candler-Hill was engaged one hundred percent in war production. For the past four years its entire facilities have worked around-the-clock shifts, producing fuel pumps for Army and Navy aircraft, ordnance tanks, amphibious tanks, landing barges, assault boats and Diesel vehicles of many types.

Oilite Book of Powder Metal Products

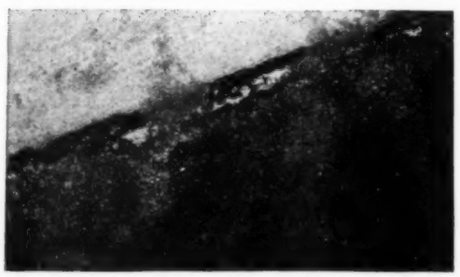
Complete with a 23 page engineering section, descriptions and photographs of all Oilite Products and listings of 13,000 available die sizes, the new Oilite catalog, above, is being sent free to all industries. For your copy of the 168 page book write Chrysler Corporation, Amplex Division, 6501 Harper Avenue, Detroit 31, Michigan.

Source of $100,000,000 Damage

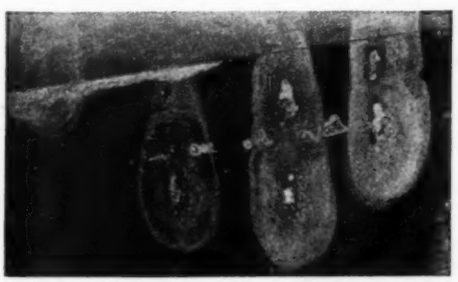
What's your share?



Rust caused by water from a leaking or "sweating" overhead pipe. Upper left portion was quickly cleaned with a cloth dampened with Cities Service Rust Remover.



Result of storage of raw steel stock subject to a humid atmosphere. Note that rusting has developed in a uniform layer. Upper half of plate was cleaned in 50 seconds with Cities Service Rust Remover.



Action of rust on sheet steel caused by finger marks in handling. Upper section has been cleaned with soft cloth dampened with Cities Service Rust Remover.

$100,000,000—that's just a conservative estimate of the annual losses caused by RUST.

Look at your records...see how much money *your* company has been penalized by this costly waste.

Adequate precautionary anti-rust measures *can* minimize or completely eliminate rust destruction.

Cities Service Rust Remover is an unexcelled first-step in plant-protection. This fast-acting liquid dissolves rust from iron or steel and removes tarnish from aluminum, brass, copper and other non-ferrous metals. Simple to apply, easy to remove.

After cleaning, let your Cities Service engineer show you how to protect and preserve the cleaned metal surfaces with a special coating of Anti-Corrode.

Cities Service will be glad to study your plant operations and recommend a complete rust-prevention program without obligation on your part. You may avoid considerable trouble and expense. Call in a Cities Service expert today.

Mail this Coupon *Today*

CITIES SERVICE OILS
ONCE-ALWAYS

Cities Service Oil Company
Room 346,. 70 Pine Street,
New York 5, N. Y.

Gentlemen: Please send me further information on your Rust Prevention Program.

Name.....

Title.....

Company.....

Address.....

City.....State.....

Victor Mfg. & Gasket Rewards for War Service

HIS outstanding record of service to America's armed forces in the application of gaskets and oil seals to mechanized warfare has earned Edward Gammie a new appointment as General Sales Manager of Victor Manufacturing & Gasket Company, it was recently announced by John H. Victor, president of the company.

Mr. Gammie joined the Victor organization in 1930 to create a special Industrial Sales Department. He was very successful in promoting sales to manufacturers and the replacement trade, also in developing the use of special products for railroads, oil field installations, refrigeration, etc. During that period he organized a nation-wide industrial distributor organization for the Victor line of oil seals and grease retainers.

In 1935 he became Industrial Sales Manager in charge of original equipment sales to automobile, tractor, truck and bus manufacturers. In recent years he has supervised the application of the Victor products to the needs of mechanized units in our armed forces. In his new position as General Sales Manager at Victor, Mr. Gammie will have complete charge of the automotive, industrial, and replacement sales divisions of the company.

New York, Ontario & Western Railroad Gets Okay for Five Diesel Locomotives

THE New York, Ontario & Western Railway will begin immediately a post-war conversion which will make it the first Class 1 line to be operated entirely by Dieselelectric locomotives, Raymond L. Gebhardt and Ferdinand J. Sieghardt, trustees, announced following the approval by the Interstate Commerce Commission of financing required in the project.

The trustees estimate that complete replacement of steam by Diesel-electric power would result in operating economies of $1,000,000 yearly, which, based on present revenues, in effect or awaiting approval, would yield the railroad a net income of about $500,000 annually. This would compare with a net loss of $2,947,253 after all charges in 1944 and with a net loss of $94,504 in the first three months of this year.

The first step in the company's Dieselization of its motive power becomes effective through the commission's authorization, which permits the company to sell $1,695,000 of (interest rate, maturity, etc.) equipment trust certificates to the Reconstruction Finance Corporation. The proceeds will be used in the payment of $2,244,073 to the Electro-Motive division of the General Motors Corporation for five oil-electric locomotives. Four of these will be of 5,400 horsepower and one will rate at 2,700 horsepower.

The New York, Ontario and Western has about 550 miles of main line, much of it with many curves and steep grades. These are the conditions under which Diesel-electric motive power operates at the greatest advantage compared with steam and it was because of these conditions that the General Motors Corporation became interested in the railway's complete Dieselization. The saving of $1,500,000 annually in operating costs expected from the change to the new power is based on a survey of the line made by General Motors in 1944. In this estimate the trustees and the railroad's officers concur.

Microscopic Drills

Save Life-Size $$$$$

Savings which a short time ago would have been impossible are now being realized by manufacturers and users of Diesel engines—with NAJET micro drills. These drills are made to entirely new standards of precision, with diameters held to plus or minus .0001", and concentricity guaranteed to be perfect as measurable with existing instruments. This means that injection-nozzle orifices can now be drilled to those extremely close tolerances which are essential for peak Diesel performance. It also means lower drilling costs through savings in reaming operations and longer drill life.

One manufacturer has drilled over 2,000,000 holes through an alloy as hard as spring steel—with NAJET drills. The average life of these NAJET drills was 300-600 holes. Some lasted ten times as long. Substantial savings can also be made by redrilling blocked injection nozzles—if the holes are not blocked with wire or unduly enlarged. Or we can reclaim them for those who do not have facilities for doing such work.

"The Only Business Of This Kind In The World", invites inquiries on all kinds of microscopic drilling, reaming, milling and other machining.

"The Only Business Of This Kind In The World"

National Jet Company

115 MILTON PLACE CUMBERLAND MARYLAND

On the Firing Line All Over the World

"DL" CONTACT MAKERS

Protect Vital War Diesels . . .

No. 220 MODEL NB-1 AND NB-5

Pressure-operated Contact Maker for lube-oil alarm system. Navy Type L.

No. 220 MODEL NL

Temperature-operated Contact Maker for coolant or bearing protection. Navy Type N for remote switching.

No. 220 MODEL NH

Temperature-operated Contact Maker for coolant or bearing protection. Navy Type N for local switching.

Thousands of diesel engines power landing barges and small ships—emergency and portable power plants are generally diesel driven. The armed services have made enormous use of diesel engines.

Tens of thousands of these diesel engines are protected by "DL" Contact Makers—the automatic protects against too high water temperature—loss of lubricating oil pressure—over-heated bearings.

These contact makers can be arranged to operate any type of alarm system—or to shut down the engine. Marine types are waterproof and resistant to high shock.

Write for Bulletin 204 and 209

DETROIT LUBRICATOR COMPANY

General Offices: DETROIT 8, MICHIGAN

Division of AMERICAN RADIATOR & Standard Sanitary CORPORATION

Canadian Representative—RAILWAY AND ENGINEERING SPECIALTIES LIMITED, MONTREAL, TORONTO, WINNIPEG

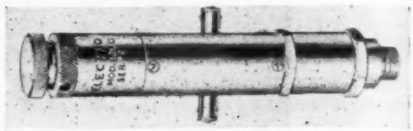
"DL" Heating and Refrigeration Controls • Engine Safety Controls • Safety Float Valves and Oil Burner Accessories • "Detroit" Expansion Valves and Refrigeration Accessories • Stationary and Locomotive Lubricators

Pressuregraph—A New Linear Pressure-time Curve Indicator

THIS new instrument provides, with the addition of a Cathode Ray Oscillograph, a substantially linear pressure-time curve on the screen of the oscillograph, which indicates the performance of any engine, pump or other device which is subject to pressure variations. Erratic engine performance can be visually noted and the reason for such operation quickly detected as the picture on the screen shows compression rise, explosion, expansion and valve operation, etc.

In addition to indicating dynamic pressure variations, it will also show static or slow pressure variations. It will operate at all mechanical speeds up to 100,000 rpm. as there is no appreciable inertia to overcome in the Pressuregraph electronic driving mechanism.

The Pressuregraph consists of two parts, first the pickup which is screwed into a hole in the cylinder wall of the engine and second the Pressuregraph cabinet, the output of which connects to the conventional Cathode Ray Oscillograph. The pickup includes a diaphragm,



The Pressuregraph Pickup Unit.

which when acted upon by pressure impulse unbalances an electronic circuit within said pickup. The unbalance voltage from the pickup is delivered to the Pressuregraph cabinet where it is amplified and then passed through a negative modulation suppressor and then to the Cathode Ray Oscillograph. The sweep circuit of the Oscillograph is adjusted to the speed of the engine or mechanism, being tested and then there appears on its screen a band of light the contour or shape of same being the true pressure-time curve of the engine. This band of light is not a single line or trace but a solid light area similar to that noted in a television picture, which is easier to read than a single line or trace. For full particulars write Electro Products Laboratories, 549 W. Randolph St., Chicago 6, Illinois.

Kurz and Root Announces New Catalog

KURZ and Root Co., has issued a 48 page catalog describing its complete line of AC and DC generators, motor generator sets and DC motors with dimensions covering each unit Contains construction features, emphasized with cutaway views of the different types generators, together with typical assemblies, and a general outline of the Kurz and Root background. Extensively illustrated with halftone reproductions of the generators themselves. Write Kurz and Root Co., Appleton, Wisconsin for your copy of this catalog.

New Caterpillar Booklet . . . Profitable Power For Mine and Mill

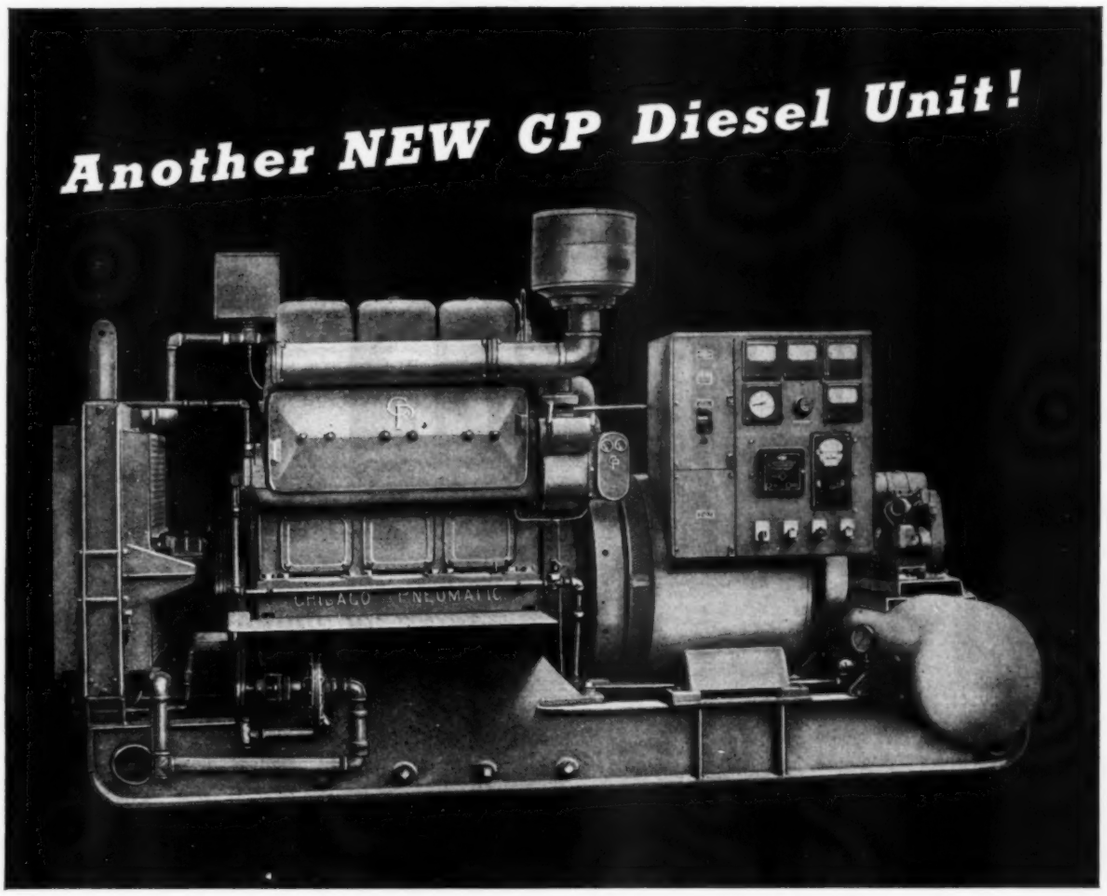
THE need for low-cost, dependable power in mine and mill operations as met by "Caterpillar" Diesels in the form of industrial engines and electric sets is featured in a new booklet, "CATERPILLAR" DIESEL, THE PROFITABLE POWER FOR MINE AND MILL, which is well illustrated showing these engines at work in a wide range of operations. For a free copy of this booklet, please write Caterpillar Tractor Co., Peoria 8, Illinois, requesting Form 8932.

FOR DIESEL APPLICATIONS

Strong—Dependable—Easily Installed

The dependability of Wittek Hose Clamps, long accepted by the automotive and aviation industries, is now being proven by actual service with the armed forces of the United Nations as standard equipment for aircraft, tanks, jeeps, trucks, ships and other combat vehicles. Wittek Hose Clamps are made in many different sizes and types for Diesel applications: Type RW for hose connections of 5" in diameter and larger; Type RM for 3½" to 5"; Type RN for 2½" to 3½" and Type FBC for 2½" hose connections and smaller. Write for new descriptive catalog. Wittek Manufacturing Co., 4305-15 West 24th Place, Chicago 23, Illinois.

WITTEK HOSE CLAMPS
Dependable Hose Connections



CP Diesel Electric Power Unit

CP presents the newest in its line of self-contained, readily portable Diesel Electric Generating Units, furnished completely equipped — capable of immediate use with the absolute minimum in installation cost.

This cleancut unit, representing the latest in advanced engineering, was designed to make power quickly available in remote locations. Ideal for mining, petroleum, utility, manufacturing, quarrying and many other fields, this heavy duty set is supplied complete with all accessories — intake filter, exhaust silencer, starting air equipment, switchboard, voltage regulator, water cooling equipment, oil storage and all required piping and wiring. Developing 100 kw., this CP unit is easily arranged for parallel operation with two or more units in multiple installation. Also available are similar portable CP Diesel Units in 175 and 250 kw. sizes. Write today for complete information.

★★★★★★★★★
PNEUMATIC TOOLS
ELECTRIC TOOLS
HYDRAULIC TOOLS
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TOOL COMPANY
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★★★★★★★★★
AIR COMPRESSORS
VACUUM PUMPS
DIESEL ENGINES
AVIATION ACCESSORIES

New Booklet on Supercharging

B-W Superchargers, Inc., a division of Borg-Warner Corporation, has issued an unusually attractive and informative booklet entitled "Supercharging for Greater Power and Improved Performance." Beautifully illustrated in colors, the booklet gives a brief historical sketch of supercharging, discusses the significance of supercharging in modern internal combustion engines, and follows the manufacture of superchargers with comprehensive views taken in the ultra-modern B-W plant. You may secure a copy of this valuable booklet by writing B-W Superchargers, Inc., 3420 West Capital Drive, Milwaukee, Wisconsin.

Alco and Union College Sign Contract to Expand College Physics Laboratories

AMERICAN Locomotive Company and Union College have entered into a contract under which the company will substantially enlarge the physics laboratories of the college in exchange for the use of certain laboratory and other facilities and for help on specific technical problems by members of the Union College science faculty.

The company has agreed to provide Union ten or twelve new laboratories. Facilities and faculty are to be available to the company for a period of five years. Announcement of the agreement was made today by Dr. Benjamin Whitaker, acting president of the college and Duncan W. Fraser, president of American Locomotive.

"We are very much pleased by this arrangement," Dr. Whitaker said. "Dr. Fox had virtually completed an understanding with American Locomotive when he died. We are intrested because we will not only expand our facilities but gain the stimulation which comes from work with industry."

In making the announcement Mr. Fraser said:

"We at American Locomotive are, naturally, glad that we can be of service to our very good friends of Union College, but this is not a gift in any sense. We have made a business arrangement out of which we expect to get many advantages. I will confess, however, that we look upon the agreement with great interest as an experiment. It is our feeling, based upon the research which we have carried on despite our heavy wartime schedules, that great advances are going to be made in the railroad and locomotive industries during the next decade—certainly in the development of Diesel-electric power but also in the development of coal-burning steam locomotives involving new principles and new applications of established principles. Some of those advances are in our minds, some are already on our drawing boards, and some are taking shape in our shops. In such a period we can use the ablest scientific minds to help us keep American Locomotive and Schenectady in the vanguard of railroad power developments. We are going to make good use of our neighbor, Union College."

1944 DIESEL PROGRESS Editorial Index

A COMPLETE index of all editorial material which appeared in the 1944 issues of DIESEL PROGRESS is now available. Included is a cross index of authors and articles. Feature articles are covered by title; news notes are indexed by names of manufacturers. No charge for this index. Address requests to DIESEL PROGRESS, 2 West 45th Street, New York 19, N. Y.

FULLER POWER FOR PEACE

For 85 years — as the world's oldest refiner — the makers of famous Be Square products have assisted in the development of many significant changes and improvements in the refining and manufacture of petroleum lubricants.

While furnishing high standard lubricants to our Armed Forces, Be Square perfected many new processes and manufacturing techniques to give the production of peacetime America finer, more efficient Diesel lubricants.

BE SQUARE HEAVY DUTY DIESEL ENGINE OILS

FULL Diesel power means MAXIMUM KILOWATT HOURS AT MINIMUM MAINTENANCE COST. For your Diesels to maintain such operating records, specify BE SQUARE HEAVY DUTY DIESEL ENGINE OILS — manufactured with IMPROVED ADDITIVES to resist ring-sticking, sludge, corrosion, scuffing and hard-carbon deposits.

Be Square lubricants are tested under high temperature operating conditions which determine their OXIDATION STABILITY, CORROSION CHARACTERISTICS, and OVERALL LUBRICATING VALUES. Many satisfied customers testify to the extra margin of protection assured by BE SQUARE DIESEL LUBRICANTS.

"BE SQUARE TO YOUR ENGINE"

Consultation Service—
Our experienced engineering services are available to your plant management without cost or obligation.

BARECO OIL CO.
BOX 2009 TULSA, OKLA.
Barnsdall, Okla. — refineries — Wichita, Kansas

"...now use Ring-Free exclusively..."

Excerpts from letter of—
N. G. HILL
N. G. Hill & Co., Contractors
Phoenix, Arizona

"...four years ago, after we purchased a fleet of Chevrolet trucks for a road construction job on Highway 77, we were induced to try Ring-Free Motor Oil.

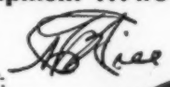
...the test was a tough one due to weather conditions...heavy snow and rain in winter...heat and dust storms in summer.

...during all this time we did not pull a head or pan in any of the trucks except one damaged by striking a huge boulder.

...after the job was completed we removed heads and pans on all motors which had from 50,000 to 60,000 motor miles.

...all compression rings were free...all drain holes in oil rings open...also drain back holes in pistons completely open and no carbon on the under side of the pistons. Cylinder heads and valves were also clean and all valve stems free in the guides. Engine pans and oil pump screens were cleaner than we expected...all bearings were in good shape.

...we now use Ring-Free exclusively in all our equipment*...we recommend Ring-Free Motor Oil to other contractors."



** 36 Trucks—Fords, Chevrolets, Internationals; 6 A.C. Tractors, Diesel powered. 1 D-8 Caterpillar; 3 Graders—2 powered by International and 1 by Caterpillar motor; 1 International T. D-40 Tractor; 1 Lorraine 40—¾ cubic yard power shovel; 3 Light Plants powered by Kohler motors; 1 Gravel plant powered by 8800 Caterpillar Diesel. Also numerous pick-ups and station wagons.*

Operators of all types of equipment report lower-cost, more efficient performance with Ring-Free Motor Oil. Find out how Ring-Free can help lick your toughest lubrication problems...Phone or write the nearest Macmillan office.

MACMILLAN RING-FREE MOTOR OIL

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National Supply Engineer Speaks On Future Of Diesel

JOHN L. OSTBORG, Chief Design Engineer of the Superior Engine Division, National Supply Company, was the principal speaker at the March 29th meeting of the Propeller Club, Port of Chicago.

Concerning the future of the Diesel engine Mr. Ostborg said that Diesel locomotives will eventually replace the steam locomotives on the passenger runs of the country. Railroads are favoring Diesels because of their greater operating economy, faster speeds, and the fact that they are in service for longer intervals between repairs. He felt sure also that it is only a question of time until Diesel switching locomotives will replace steam, although he was not so certain about Diesel mainline freight locomotives in competition with steam.

Large trucks will all eventually be powered by Diesels, according to Mr. Ostborg. Smaller trucks probably will continue to be gasoline-powered for the most part. "As for the smaller workboat," the speaker commented, "steam has lost out all along the line. The Diesel engine has definitely 'taken over' in this market."

John L. Ostborg

Two fields the Diesel will not invade are the automobile and the airplane, Mr. Ostborg said. The gasoline engine is still the more flexible and responsive to the throttle, which will make it the preferred power for the automobile, even though the Diesel operates more economically. As for the airplane, the gasoline engine will be replaced, the speaker said, by some form of jet propulsion, probably in all sizes of planes.

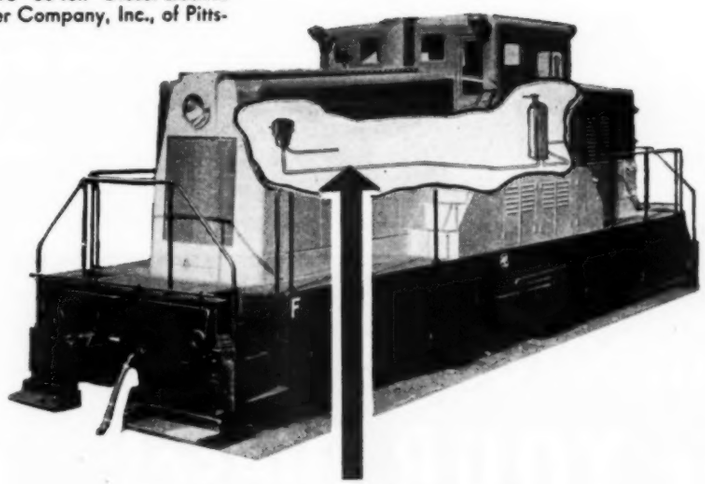
Paul W. Bernhard Appointed Morse Chain Advertising Manager

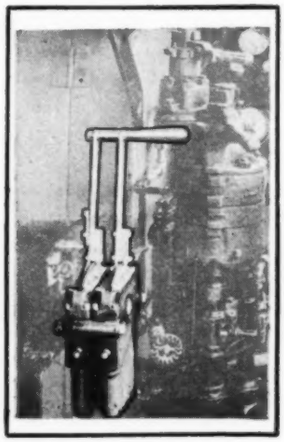
Paul W. Bernhard

MORSE Chain Company has announced the appointment of Paul W. Bernhard as Advertising Manager. Mr. Bernhard was formerly with Bell Aircraft and Curtiss-Wright at Buffalo.

Centrifugally Cast
DIESEL CYLINDER LINERS
INCHES 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Ready for Use
CENTRIFUGALLY CAST DIESEL CYLINDER LINERS by JANNEY are furnished in the completely finished condition ready for immediate installation. Liners are produced under the closest of scientific and laboratory controls. Our facilities for production of liners having I.D's ranging between 8" and 14" are exceptionally adequate. We stress that all liners must be void of "free ferrite" which is a most energetic source of scoring. Liners can be furnished with the PORUS-KROME* treatment. Our technical staff is at your service supplemented by our many years experience in cast iron metallurgy.
*Van der Horst
JANNEY CYLINDER COMPANY
7428 STATE ROAD, PHILADELPHIA 36, PA.

Below is shown the progressive 80-ton Diesel-Electric Switcher, built by the H. K. Porter Company, Inc., of Pittsburgh, Pennsylvania.





The slightest movement of the throttle is hydraulically transmitted to the motor speed control.

SPERRY'S HYDRAULIC CONTROLS minimize design problems by means of a single connecting tube that can be bent around corners and obstacles or installed through bulkheads, thus reducing design, installation, and maintenance costs.

The H. K. Porter Company, Inc., of Pittsburgh, makers of the well-known Porter Diesel-Electric Switchers, now feature "fingertip control" on their locomotives. This selection adds another application of the Sperry Hydraulic Control; a single-line remote control and positioning device, used successfully by many and varied industries. This is what the H. K. Porter Company has to say about the Sperry Control:

- "The installation assures accurate synchronization of the speed of the two diesel engines in the double power plant.
- It accomplishes this by eliminating the necessity for mechanical linkage from the operator station to the engine by means of flexible piping.
- This method has advantage over previous installations because it does away with troublesome rods, jaws, pins, cables, pulleys, and turnbuckles, and the necessity for mechanical alignment.
- It eliminates lost motion of the mechanical method, back lash, and need for constant adjustment. Just as the installation is easy to design and build, so is it easy to maintain. The control gives instant and accurate response to the slightest movement of the throttle."

EASY INSTALLATION . . . DEPENDABLE . . . ACCURATE

Send for Bulletin 78 for additional details

SPERRY

For Scientific Achievement

SPERRY PRODUCTS, INC.

CHICAGO, ILL. HOBOKEN, N. J.

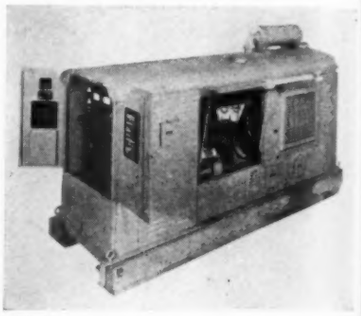
Fifth "E" Star To American Blower

THE American Blower Corporation has been awarded the fifth Army-Navy "E" star for maintaining an excellent record on production of fluid drives for the war effort at their Detroit and Dearborn plants.

With a tapering off of war orders, the corporation has already made plans to devote its enlarged facilities, skill and experience to the design, development and application of fluid drives to meet the greatly expanded requirements for fluid drive in many industrial fields.

New Bardco Diesel-generating Unit

PRODUCTION of a new type Diesel generating plant is announced by Bardco Manufacturing & Sales Company, Los Angeles, California. The plant is designed especially for use at advanced air bases for the Army Air Forces. The unit delivers 37.5 kva. 60 cycle current 240 volts, 3 phase, and at 120 and 138 vo single phase. An unusual feature is its abi to operate at outside temperatures rang from 67°F. below to 130°F. above zero.



Mounted on a welded I-beam frame, the 500 pound plant may be hauled or skidded to an desired location. Completely contained in a heavy-duty, sheet-metal housing, it may be operated under any weather conditions, and in an climate in the world. Louvres on both sides o the housing are adjustable for warm or cold climates.

The alternator, of Bardco design and manufacture, is a single-bearing flange mounted type and is connected to the Diesel engine by a special Bardco flexible coupling. The exciter is built-in and of a new type that greatly reduces the over-all length of the alternator. Cooling of the alternator is by forced draft, with four Farr air filters on the inlets, and a thermostat on the exhaust air which operates an alarm should the alternator become overheated.

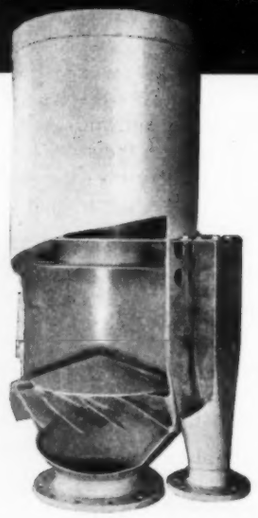
The engine is a 6-cylinder Chrysler Diesel Industrial Engine, Model IND-3, which has been modified for its use in the Bardco generating plant. The engine operates at 1800 rpm., and delivers 61 net brake horsepower, at that speed.

Electro-Motive Appoints Nelson Dezendorf Director of Sales

APPOINTMENT of Nelson C. Dezendorf as Director of Sales of the Electro-Motive Division of General Motors Corporation has been announced by C. R. Osborn, Vice-President of General Motors and General Manager of the Division. The appointment was effective June 15. Growth of the Diesel locomotive business necessitated creation of the new position and the appointment of Mr. Dezendorf. Mr. Dezendorf comes to Electro-Motive with a background of long experience in sales direction and close connection with the particular sales problems of Electro-Motive.

. . . . *And now please turn to page 110* . . . .

Engineered especially for YOUR Diesel



OTHER VORTEX PRODUCTS
Wet Type Silencers
Spark Arresters
Heat Recovery Silencers
Dust Catchers
Steam Separators

Because its basic design permits compensation for all exhaust variables—degree of silence, back pressure, gas volume, space available, etc.—a VORTEX Spark Arresting Silencer installed with your Diesel engine will be the most efficient auxiliary you could possibly select.

There are no turbulent, high resistant passages to retard the effectiveness of the VORTEX Spark Arresting Silencer and since it is "tailored" to fit your specific job it will achieve a lower decibel rating than any other comparable silencer with the same back pressure—size for size.

As pioneers in the field of Diesel silencing and spark arresting, the manufacturers of VORTEX have incorporated the knowledge and experience gained through years of study, engineering and building into this *proved* spark arresting silencer . . . now available to you.

Get the whole story by writing—without obligation—for Bulletin No. 728.

ENGINEERING SPECIALTIES CO., INC.
39 CORTLANDT STREET • NEW YORK 7

VORTEX
SPARK ARRESTING SILENCERS

POSITIVE LEAKPROOF *Remote Control*

Official U. S. Navy Photograph

● Maximum flexibility of control is provided by Grove Flexflo Valves in the operation of large and smaller Diesel Engines. On Diesel starting, air is normally supplied instantly upon demand, but the Flexflo Valve is readily adjustable for retarded-opening in accordance with existing requirements. Being fully self-operating and utilizing *NO METALLIC* moving parts. This Expansible tube type valve delivers smooth, non-turbulent flow at capacities greatly in excess of conventional globe and other types of valves. Positive bubble-tight shut-off precludes the loss of air, fluids or gas. Remote operation is effected by any standard medium. Investigate fully, today.

★ *ELECTRIC*

★ *DIRECT PNEUMATIC*

★ *INDIRECT HYDRA-PNEUMATIC*

★ *INDIRECT HYDRAULIC*

Although primarily employed for air-starting service Grove Flexflo Valves readily adapt themselves to many other Diesel applications such as in the Remote Control of: Cooling Water; Auxiliary Lubricating Oil; Fuel Oil; Gas; Gasoline, etc. For full details

WRITE FOR
DIESEL BULLETIN *#810 TODAY*

GROVE *Flex-Flo* DIESEL VALVE

GROVE REGULATOR COMPANY

6495 GREEN STREET, OAKLAND 8, CALIFORNIA • *Branch Offices:* 30 Rockefeller Plaza, New York 20 • 5844 Navigation Boulevard, Houston 11, Texas • 1930 West Olympic Boulevard, Los Angeles 6, California

Dezendorf,

continued from page 108

Born in Portland, Oregon, April 23, 1898, Mr. Dezendorf attended the University of Oregon and after service in the Army in World War I returned to the University of California where he graduated with an engineering degree. During 1920 and 1921 he surveyed west coast and European port activities for the

Nelson C. Dezendorf

European Pacific Steamship Company. He entered the employ of General Motors Acceptance Corporation at Portland in May, 1922.

In 1927 Mr. Dezendorf became manager of the Seattle office of General Motors Acceptance Corporation. Subsequently he was transferred to the business development department in New York and in 1929 was placed in charge of that activity. He was elected Vice-President of G.M.A.C. in 1931 and in the following year was given a special assignment with the sales section of General Motors Corporation in Detroit. He returned to his G.M.A.C. duties in the Fall of 1933. His close connection with the Diesel locomotive business began shortly thereafter when he initiated and directed a General Motors Acceptance Corporation plan for financing locomotive sales that was highly effective through the early development period of Electro-Motive Division.

Mr. O. F. Brookmeyer, who has been Sales Manager of Electro-Motive for twenty-one years, will continue in that position until he is able to retire.

Baldwin Appoints C. A. Campbell Export Sales Manager

APPOINTMENT of C. A. Campbell as export sales manager of The Baldwin Locomotive Works succeeding the late Clyde G. Pinney was recently announced by Ralph Kelly, president.

Campbell first joined Baldwin as a shop apprentice August 1, 1919. He was made district manager at Washington, D. C., shortly after Pearl Harbor and in that capacity handled all government orders for Baldwin products until his present appointment.

C. A. Campbell

Succeeding him as district manager of the Washington office is Milton W. Brooks, who has been associated with Campbell handling Navy and Maritime locomotive and marine products for several years.

She and Mack are a popular couple

Down in New Iberia, *Barbara Ann* is known as a lady you can trust. She's the boat people call for when there's a towing job to be done on which no breakdown can be tolerated. The Mack Marine Diesel which powers *Barbara Ann* was installed three years ago, and owner Eustis Theriot says he hasn't lost a single minute's work through engine failure ever since. That's honest performance. That's *Mack* performance. Try Mack and you'll see.

Mack

DIESEL MARINE POWER

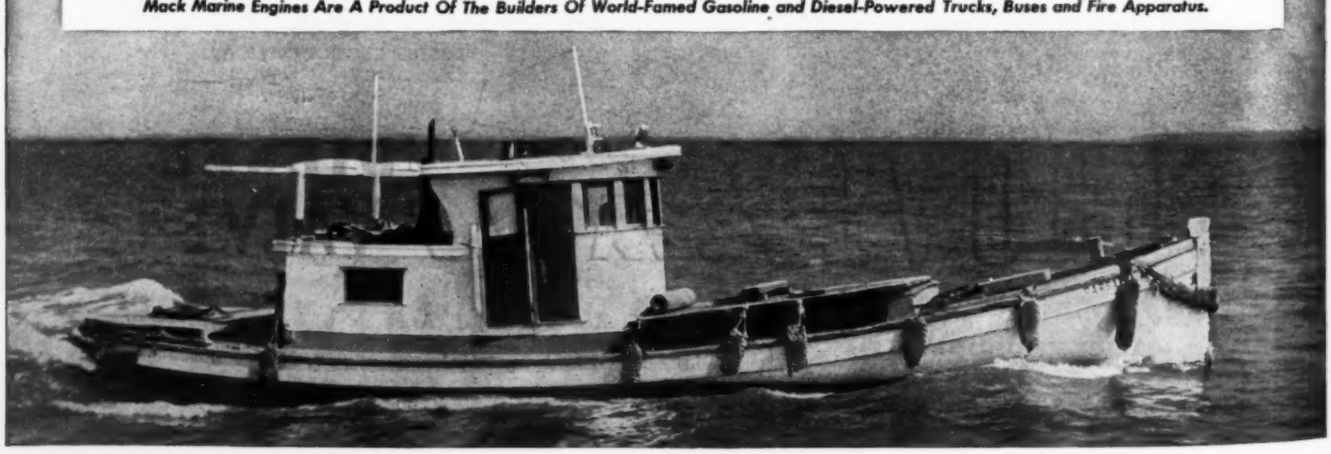
ARMY E NAVY

BUY U. S. WAR BONDS

MACK MANUFACTURING CORPORATION

Marine Engine Division, Empire State Building, New York 1, N. Y.

Mack Marine Engines Are A Product Of The Builders Of World-Famed Gasoline and Diesel-Powered Trucks, Buses and Fire Apparatus.



AGAIN RATED FIRST FOR DEPENDABILITY!

E-M "PACKAGED" GENERATORS

Q. WHAT DO YOU CONSIDER THE MOST IMPORTANT ADVANTAGE OF YOUR E-M "PACKAGED" GENERATORS?

With these E-M "Packaged" Generators running day and night supplying electric power for irrigation pumps, it's not surprising that *dependability* should be rated as their foremost advantage by the Dominguez Water Corporation of Dominguez, California.

For 4½ years these generators have been in constant service on this important irrigation job. Yet there's *never* been a power interruption and "practically *no* time", to quote the plant manager, spent for maintenance.

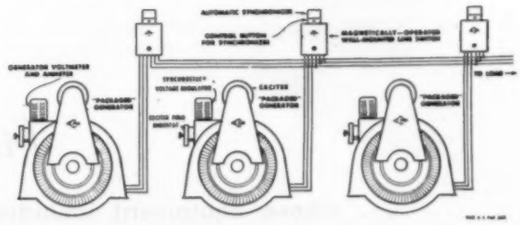
Results like this are typical of all E-M "Packaged" Generators. Products of the same engineering skill which originated America's first "packaged" generator, E-M Generators offer maximum dependability, efficiency and ease of operation in *your* power plant. *Call in an E-M field engineer on your next job!*

PARALLELING IS FAST, CORRECT AND AUTOMATIC

●Eliminating need for skilled operators for paralleling, E-M "Packaged" Generators can be put on the line *automatically!*

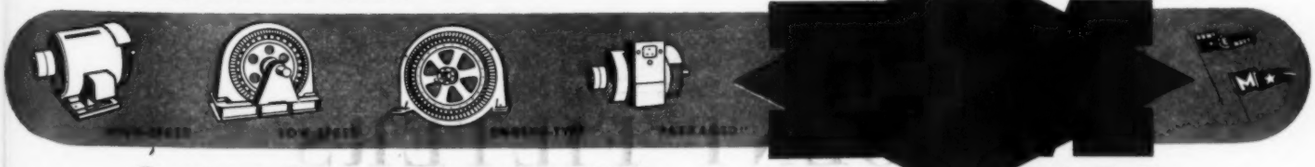
Pressing "on" button of E-M Automatic Synchronizer closes magnetic line switch when generator is up to speed. Makes paralleling safe, rapid and correct.

This diagram shows simplicity of installation wiring and control.



ELECTRIC MACHINERY MFG. CO.
MINNEAPOLIS 13, MINNESOTA

GOOD ENG[illegible]S DESERVE



Specialists in Synchronous Generators since 1903

GENERATORS

A2018

Aireon Elects Two Vice Presidents

ELECTION of two vice presidents was recently announced by Randolph C. Walker, President of the Aireon Manufacturing Corporation.

Arthur E. Welch

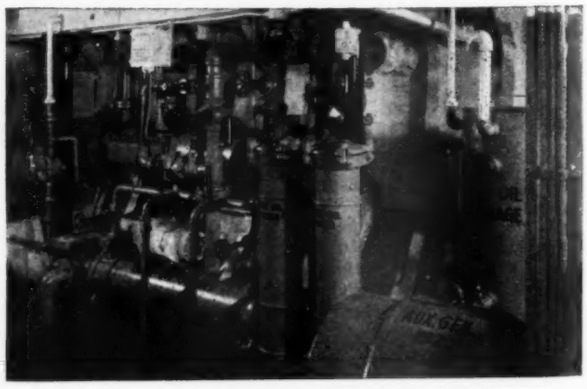
Arthur E. Welch, formerly Secretary and Treasurer, was elected Vice President and Treasurer, and Ralph E. Middleton, formerly Chief Engineer, was elected Vice President in Charge of Engineering of the Hydraulics Division at Burbank, California.

Mr. Welch has a wide background in financial affairs, having been associated with the Dayton Savings and Trust Company in Dayton, Ohio, the Frigidaire Corporation, the A. & W. Refrigeration Company, and the Brewster Aeronautical Corporation where he was assistant treasurer during the regime of Henry J. Kaiser. He also had war-time service with the audit section of the U. S. Army Air Forces. He joined Aireon Manufacturing Corporation early in 1944, when it was known as Aircraft Accessories Corporation, as Controller of the Kansas City Division.

Mr. Middleton was an engineer with the Army Air Forces at Wright Field for more than 10 years. He subsequently was a staff engineer for Curtiss-Wright and designed the landing gear and tail wheel installation for the C-46. He became Chief Engineer of the Aireon Manufacturing Corporation, Burbank Division, in May, 1941.

Fifth "E" Award To Cleveland Diesel Engine Division

ANNOUNCEMENT of the award of the fifth star on the Army-Navy "E" flag was recently made to the men and women of the Cleveland Diesel Engine Division of General Motors Corporation by George W. Codrington, General Manager of the Division. In speaking of the award Codrington said, "We have successfully met the Navy's demands for engines and parts since the start of the defense program. To this time we have produced engines totaling more than 10 million horsepower—and we're not stopping now. We must continue the good work until the Japs have been decisively beaten." He continued by saying that "Cleveland Diesel has been highly honored by the Navy because only one other plant in Cleveland is authorized to fly the Army-Navy "E" flag with five stars."



Tugs are Long-Life Vessels

. . whose equipment includes dependable NUGENT FILTERS

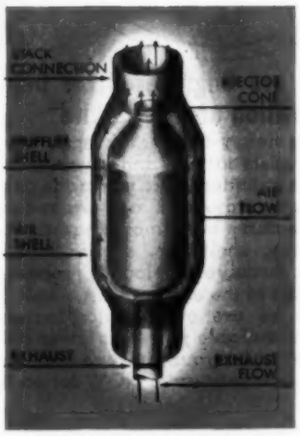
Nugent Duplex Filters, as used in conjunction with Diesel engines, add to the life span of that dependable equipment by eliminating harmful elements from the lube oil while retaining the additives which have been incorporated in the oil. Clean oil, as secured by the use of Nugent Filters, also reduces maintenance costs and increases engine efficiency. Actual tests on oil from an engine, before and after installation of a Nugent Filter, give *visible* proof as well as chemical analysis to prove the efficiency of the filtering equipment. Write today for full details on Nugent Filters.

Wm. W. Nugent & Co., Inc., Est. 1897 415 N. Hermitage Avenue, Chicago 22, Illinois

NUGENT FILTERS

THE MUFFLER THAT KEEPS ITSELF COOL

The FLUOR *Air-Cooled* Muffler cools itself ... and the entire exhaust system ... by using engine exhaust energy to pull a steady stream of air through its entire length. No insulation of any kind is required. Corrosion in the entire system is minimized because of cooler, drier operations. This coolness means less shutdown time for painting, and longer muffler life.



All FLUOR Air-Cooled Muffler Designs are fully protected by U.S. Patents & Patents Pending.

THE FLUOR CORPORATION, LTD., 2500 S. Atlantic Blvd., Los Angeles 22
NEW YORK • PITTSBURGH • KANSAS CITY • HOUSTON • TULSA • BOSTON

FLUOR

ENGINEERS • MANUFACTURERS • CONSTRUCTORS

Detroit Diesel Division Appoints William C. Gould

THE appointment of William C. Gould as sales manager of the Marine Department of Detroit Diesel Engine Division of General Motors Corporation was announced recently by V. C. Genn, General Sales Manager for the company. Mr. Gould will supervise the distribution and sales of the Series 71 Marine Diesel engine across the country.

Mr. Gould, who is a member of the Society of Automotive Engineers, brings to Detroit Diesel a wide experience in various lines of industry. He studied mechanical engineering at Lafayette College and then served several years abroad with the Brewster Aeronautical Corporation and the United Aircraft Corporation. For the past four years he held the position of service manager for the Allison Division of General Motors Corporation in Indianapolis, Ind.

Prior to January 1st of this year the sale of Detroit Diesel's Series 71 engine to the marine industry had been handled through the Gray Marine Motor Company. This arrangement has terminated and the Detroit Diesel Engine Division is now set up to build complete marine engines and sell them through well-located dependable dealers throughout the United States and Canada.

William C. Gould

MARINE **BUCKEYE** STATIONARY **DIESELS**

POWER BUCKEYE ECONOMY

IT'S TIME NOW!

To decide on your New Diesel Engines

Buckeye Diesels are Engineered for Dependability, Economical Operation and Long Life

- 1. Buckeye heavy-duty crankshafts are solid forgings of special steel which resists fatigue and crystallization.
- 2. Buckeye cylinder liners are made of close-grained, extra hard nickel chromium alloy, and are water-cooled over their entire surface. These features have more than doubled the life of the liners.
- 3. Reversible, shell-type, silver-alloy bearings—manufactured by a special Buckeye-developed process—will last, with proper care, for the life of the engine.

There are other major features that help produce dependable power at lower cost for Buckeye owners.
Write for your Buckeye bulletins.
Place your order NOW for early delivery.

Stationary and Marine Propulsion (Direct Reversing) Engines 150-*1440 H.P.

Marine Auxiliary and Stationary Generator Sets 100-*1000 KW

*Supercharged Ratings

"Be Profit-Wise and Dieselize with Buckeyes"

THE BUCKEYE MACHINE CO., LIMA, OHIO

· ENGINE BUILDERS SINCE 1908 ·

Home Study Course Science of Measurements

A NEW educational feature has been announced by DoALL—a correspondence course titled "Science of Measurement." Feeling that wider knowledge of precision measurement will aid industry in cutting costs and increasing production, this company has prepared a group of eight lessons for industrial and vocational gage training programs.

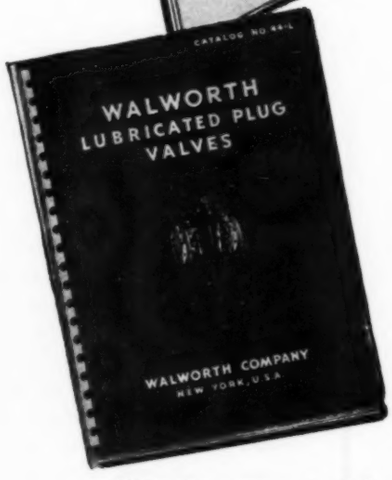
Nothing connected with precision measurement has been overlooked. The lessons amply illustrate the care and use of gage blocks, many concrete examples are given along with photographs showing how their use may be expanded and how they may be utilized as direct working gages in conjunction with gage holders and instruments. Hundreds of photographs show inspection and engineering methods utilizing height gages, locating gages, go-no-go gages, inside and outside micrometers, lead screw measuring gages, scribers, dividers, and the new mobile inspection unit. Tables and formulas make simple such problems as measuring pitch diameter of screws, splines, and helical gears by the three wire method, and measuring of angles, bevels and tapers by use of the sine bar. A full booklet is devoted to the Comparator, showing the complete versatility of this instrument as a machine and its endless inspection possibilities when used with fixtures.

. . . . *And now please turn to page 118* . . . .

YOUR NEW

Walworth Lubricated Plug Valve Catalog

IS NOW READY!



Write for your copy today
on your Company letterhead

Between the covers of this 94-page book you will find ways that Walworth can help you with your problem of handling petroleum products . . . acids . . . condensates . . . mud . . . organic solvents . . . slimes . . . slurries . . . and many other "difficult" liquids where conventional types of valves do not give satisfactory service. It is to your advantage to have this informative, important data.

A request on your company's letterhead, will bring you a copy of Catalog 44L. Write now!

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TO 4 PLANTS

WALWORTH
valves and fittings
60 EAST 42nd ST., NEW YORK 17, N. Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

Home Study,

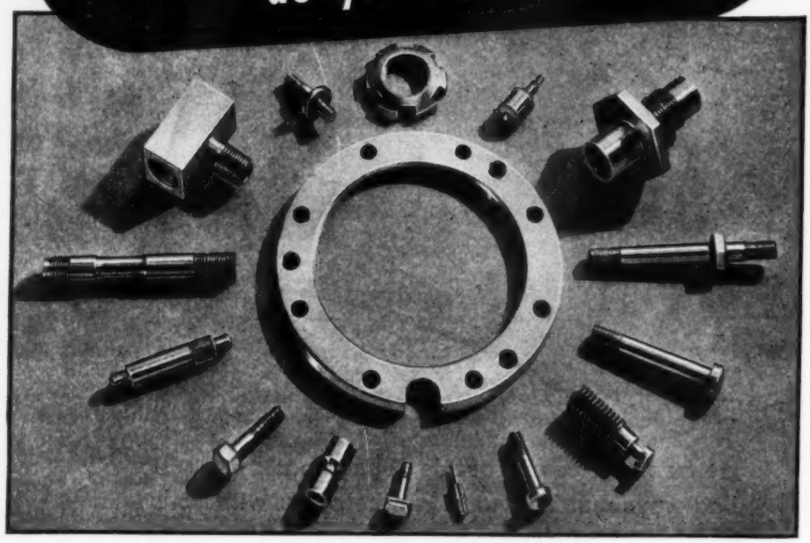
continued from page 114

The chapter on light wave measurement makes clear in language even a layman can understand how simple this basic measuring means is, and how, by use of the monochromatic light and optical flats, measurements of flatness, parallelism, length, roundness, and so on may be made direct with ease and certainty.

Clearly and concisely written, with complete data, questions and answers, this course should give even a novice a working knowledge of precision measurements. It will be of particular value to plant inspection departments checking new ways to establish quality control over their products. The whole eight lessons are spaced to cover a two months period. Mailings are made direct to the homes of inspection personnel on the basis of one lesson each week.

Detailed information on how these lessons may be obtained can be secured by addressing Continental Machines, Inc., 1301 Washington Avenue S., Minneapolis 4, Minnesota.

What kind of SCREW MACHINE PRODUCTS do you need?



Regardless of the number of intricate finishing operations required to complete the Screw Machine Products you need—you will find The Chicago Screw Company a dependable source of supply . . . For over 73 years we have specialized in the manufacture of screw machine and cold upset products in *any size, any shape* and in unlimited quantities.

All secondary operations are performed in our vast factory, and include Milling, Drilling, Broaching, Grinding of any type—precision Thread Rolling, Hydrogen Brazing, Electronic Heat Treating—all are accurately and rigidly controlled from rough stock to finished product.

If your parts are simple screw machine items or really "fussy" jobs—try "Chicago Screw"—you'll find there is a difference.

ARMY E NAVY

THE CHICAGO SCREW CO.
1026 So. Homan Avenue Chicago 24, Ill.

Briggs Clarifier Appoints Chief Engineer

BRIGGS Clarifier Company has announced the appointment of George S. Garrard as Chief Engineer. Mr. Garrard, who has had wide experience in aviation and industrial engineering, goes to the Briggs post from Jacobs Aircraft Engine Company of Pottstown, Pennsylvania, where he was Assistant Chief Engineer in charge of all engineering branches. The Jacobs plant produced Pratt and Whitney aircraft engines under license agreement.

George S. Garrard.

Prior to joining the Jacobs staff, Mr. Garrard was Design Analyst for the Pratt and Whitney Aircraft Corporation of East Hartford, Connecticut. Garrard attended McKinley Tech High School in Washington, D. C., Emmerich Manual Training High School of Indianapolis, and Purdue University.

United States Motors Issues a "Photographic Story"

A "PHOTOGRAPHIC Story" of the company, its personnel, plant and products, has been issued by United States Motors Corporation. This 34-page booklet presents an intimate and highly personalized view of this entire organization from top executives through the office staff into the busy shops where products are seen in various stages of production and assembly and on through the nation-wide distributor organization. Yes, an intimate and most interesting picture-and-caption story of this concern whose products are serving virtually every branch of the armed forces. Executives, personnel directors, shop superintendents as well as those interested in the purchase of its products, will enjoy this refreshing booklet. Write for your copy to United States Motors Corporation, Dept. D., Oshkosh, Wisconsin.

... That ships can move Materiel-Munitions-Men

I AM PROUD TO FIGHT...

I began life as a 33,000 lb. white-hot billet of fine steel.

Forging Hammers and Presses, Heat-treating Furnaces, Machines and Men trained me down to fighting weight . . . around 10,000 lbs. ringside.

I drive Liberty Ships, Submarines, P-T Boats, the Diesels of War.

I am proud to fight for the United Nations . . .

I was wrought, forged, seasoned and machined by expert designers, engineers and craftsmen at Erie Forge Company.

My counterparts..Shafting, Connecting Rods, Crankshafts, Steel Forgings and Castings..aregoodtoughfighters for the battle of the Nations and for Industry.

ERIE FORGE COMPANY, ERIE, PA.

Supervising,

continued from page 80

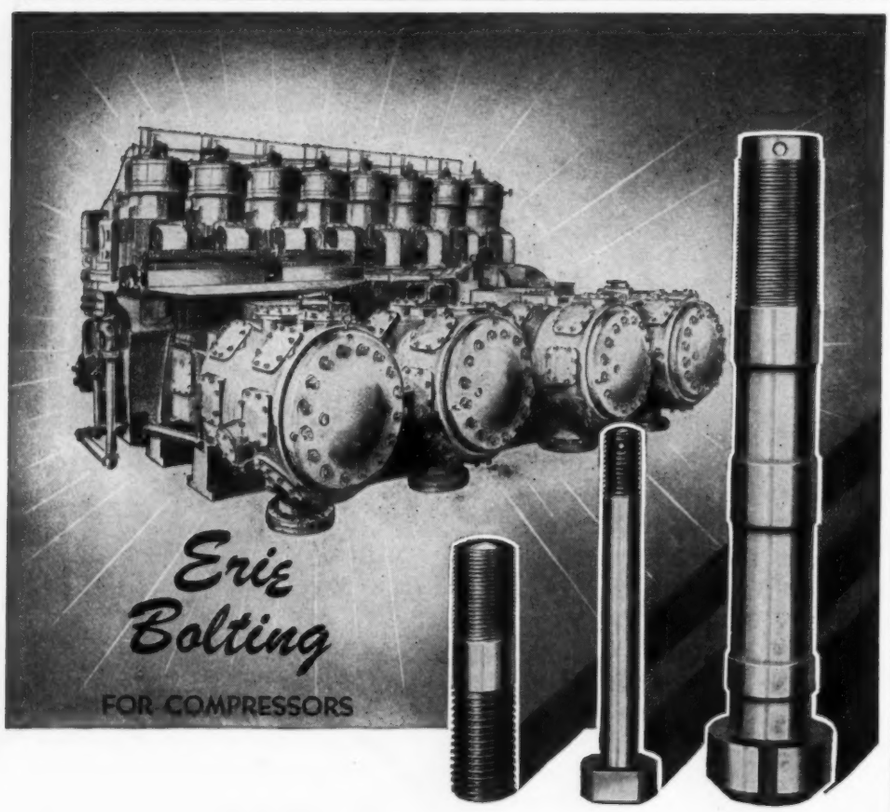
ing valves, scavenging header, air filters and any breathing equipment which may be used in conjunction with the unit.

13. Check shaft alignment, cam settings, lift rods, valve gear and any other parts which may be subjected to excessive wear.
14. Inspect and check governor and test all safety appliances.
15. Remove and clean all gauge lines, fuel lines, air and water lines which may have a tendency to plug up. This pertains especially to small copper lubricating lines, to the liners, gauges and safety devices.
16. After the unit has been reassembled, the crankcase should be thoroughly cleaned and filled with either good reclaimed or filtered oil or with new oil. This depends a great deal on your method of lube oil filtration and the analysis of the oil.
17. Inspect all auxiliary equipment such as raw water pumps, soft water pumps, transfer pumps, fuel and lubricating pumps, day and service tanks, filters and meters and any other equipment which can not be inspected and cleaned while the unit is in operation.
18. Inspect and clean all electrical equipment, generator, exciter, oil breakers, rheostats and any other equipment which cannot be worked on while unit is operating.

The foregoing is a list of work to be done as applied to the above mentioned unit. Each unit will have its own individual points to be inspected and an engineer or supervisor must use his own judgment in making up a work schedule such as the above and apply it to the unit in question. This list should then be handed to the person in charge of the job and as the work is completed he is to check the work as finished. In this manner nothing will be overlooked.

Now that you have the work schedule arranged, the next step is to check your list of repair parts in stock to see that all materials likely to be needed in the overhaul are at hand. A great help in this step is to carry a perpetual inventory of your stock. By going to these records (if properly kept) you can check on the items available and if you find that you are short certain items procure them before starting the job. Let's just cite a few examples of the above. If your unit has been in operation for several months you will undoubtedly need some new piston rings as some of the old ones will either be broken, or worn thin and the proper tension be out of them. Check your stock to see that you have ample replacements. Or you may find that you will need to replace some of the fuel needle valves, check valves, atomizer cones or plates, or perhaps a flame plate, and there are always gaskets that have to be replaced. If such material is on hand much time and labor will be saved.

Of course you will occasionally run into some unforeseen conditions which may require major parts which you have not stocked. That is a condition which you cannot always foresee, but generally a rare situation. Supervisors and engineers, living with their equipment in daily operation should be pretty familiar with any defective major parts which might need renewing. Occasionally you may find a badly fire-checked piston head, a scored piston which you would like to replace or a liner so badly out of round that it should be replaced. In such instances you generally have a forewarning of coming trouble and can be prepared for it. Many small plants do not feel that they can afford to tie up money in spare major parts, which may not be used for months or years, but it is a mighty convenient thing to have a



SEND YOUR BOLTING SPECIFICATIONS TO A SPECIALIST

ERIE is manufacturing bolts and studs to the exacting specifications of many compressor builders. We are equipped to work with any material heat treated and threaded to specification and machined to specified tolerances. Consult with Erie Bolt & Nut Company for your next requirements.

ERIE BOLT & NUT CO.
ERIE, PA.
STUDS • BOLTS • NUTS ~ ~ ALLOYS • STAINLESS • CARBON • BRONZE

spare piston or liner available if your plant is large enough to be able to keep such spares in stock and as often stated it is mighty good insurance.

Now that you have a job number allotted to this inspection and overhaul, your work schedule arranged and materials in stock checked and ready, you are in a position to arrange your operating schedule for other plant units so that you will have proper outage time to do a real workmanlike job.

In next month's installment we will follow such a job through, showing and illustrating the various steps of an overhaul as the work progresses how the materials and time are charged up and discuss various conditions as found and corrected.

Bedell Appointed Sperry Export Manager

STANLEY W. BEDELL has been appointed export sales manager of the Sperry Gyroscope Company in addition to his responsibilities as general field service director, it is announced by H. H. Willis, vice-president for sales.

Stanley W. Bedell

A native of Springfield Gardens, L. I., Bedell attended the United States Naval Academy and has filled various positions in Sperry's sales and service departments since joining the organization as compass test engineer 22 years ago. Bedell succeeds the late Howard Welch as Sperry's export sales manager.

Young Radiators Cool Skid-Mounted Units

FOLLOWING publication of an article on Emergency Diesel-Generating Units, Page 75 DIESEL PROGRESS for June we are advised that the engine cooling equipment for these sets employing General Motors Diesels, is supplied by Young Radiator Company.

Diesel Indicator Application

A STUDY for the Bacharach Industrial Instrument Company is being made on indicators and their possible applications in the diagnosis of operating conditions of compression ignition engines. One aim is to determine the effect on compression and firing pressures of engine operating conditions such as fuel pump timing, fuel nozzle conditions, valve timing, mechanical conditions of pistons, rings, and liners, clogged intake and exhaust pipes, and supercharging and scavenging conditions. The relation of chemical characteristics of Diesel fuels to maximum cylinder pressure and rate of pressure rise during combustion will be studied. The work will include correlation of cylinder pressures with other operating factors such as cooling water temperature, exhaust gas temperature, cylinder horsepower output, fuel consumption, and engine speed, to develop standards in the use of instruments incident to Diesel engine maintenance and operation. *From a report on Industrial Research Progress at the Armour Research Foundation 1943-44 published in Chemical and Engineering News.*

prevent time-out for repairs

Manufacturers and maintenance men know that Sludge, Gum and Acid are major causes of engine deterioration. For fifteen years an ever increasing number have been using LOOSITE and SILOO to dissolve these petroleum residues and prevent their formation.

The action of LOOSITE and SILOO is simple, safe and sure. First LOOSITE poured in the crankcase cleans out the engine, then SILOO added with fresh oil keeps it clean. Now that engines must be kept in full-time service it's more important than ever that you prevent Sludge, Gum and Acid from sending yours to the repair shop.

See that they get the LOOSITE and SILOO treatment. Full information upon request.

If you heat with oil—write for information on SILOO FUEL OIL TANK SOLVENT.

PETROLEUM SOLVENTS CORPORATION
331 Madison Avenue, New York 17, N. Y.

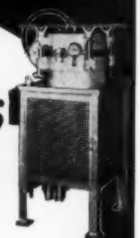
SPECIFY HILCO

FOR LUBRICATING, FUEL AND INDUSTRIAL OIL PURIFYING

A complete line of lube oil purifiers using Fullers Earth – cotton waste and specially prepared filtering agents.

HILCO OIL RECLAIMERS

A simple, economical and foolproof method of restoring contaminated oil to the full value of new oil, – for direct connecting to one or more Diesel engines for continuous or intermittent operation.

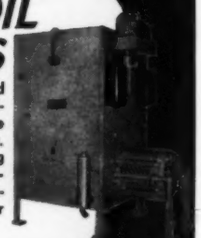


HILCO HYFLOW OIL FILTERS ••

A superior oil filter for perfect filtering of Diesel engine lube oil – for direct-connecting to one or more engines – continuous or intermittent operation.

HILCO AIRLINE OIL PURIFIERS

A perfect method for contact oil purifying for complete oil reconditioning. For batch purifying directly from engine lube oil system or transfer tanks.



The Hilco line offers you a complete lubricating oil purifier service. Write today for free literature and see what Hilco operators are doing—then let us help you select a Hilco to take care of "That Particular Job"

OIL PURIFIER HEADQUARTERS

THE HILLIARD Corporation

122 W. 4th ST., ELMIRA, N. Y.

Metric Gage Blocks

THE makers of DoALL Precision gage blocks and instruments announce a new series of Mertic Gage Blocks designed to fill the needs of domestic and foreign manufacturers working in the Metric system.

Set of DoAll Metric Gage Blocks

These blocks are offered in two grades that correspond in accuracy with the English system. Inspection quality guaranteed accurate within plus or minus .0001 MM and working quality guaranteed accurate within plus or minus .0002 MM. To plants working in the Metric system, either in full production or special contracts, this set of precision gage blocks will save considerable time and insure required accuracy. The standard policy of converting English measurement to Metric can be eliminated entirely with the wide range of measuring combinations possible. Calibrated in the Metric system, the blocks can also be used to make up English system combinations.

The set consists of 38 blocks plus 2 wear blocks (of tungsten carbide in the inspection grade) and is capable of producing over 100,000 combinations ranging from 1.01 MM to 100. MM in increments of .01 MM. A special 1.005 MM block in the set makes possible special combinations for closer tolerances where needed. Manufactured from high carbon chrome steel, the blocks are guaranteed to exceed a hardness of 65 Rockwell C. A special aging process using alternate heating and freezing to 120 degrees below zero gives the blocks unusual stability, while exceptional wearing quality is possible because of the extremely fine surface finish, less than four tenths of one micro inch RMS in the Inspection Grade. This 40-piece Metric set is furnished in an attractive and compact cloth-lined walnut case, where the blocks stand up on end for convenient handling. Precision

Evaporative Coolers by Fairbanks-Morse for

ECONOMY
EFFICIENCY
EFFECTIVENESS

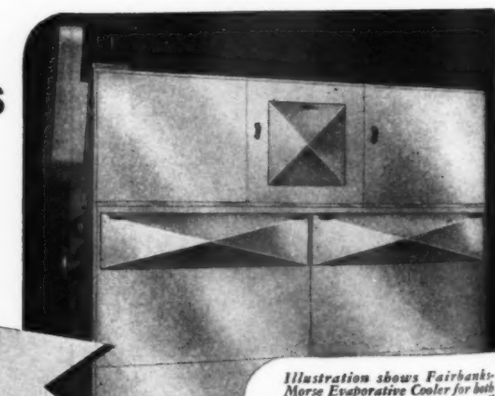


Illustration shows Fairbanks-Morse Evaporative Cooler for both jacket water and lubricating oil from a 2000-hp. Diesel engine

A Fairbanks-Morse Evaporative Cooler, in a closed system, cools engine jacket water most economically, efficiently, and effectively. It eliminates freeze-ups. By circulating *clean, soft water,* it keeps passages free from scale and dirt. It economizes on fuel — keeps water and lubricating oil always at the same temperature. It saves space, simplifies piping systems. And, where it replaces a heat exchanger using raw water, effects a saving in water and pumping costs of about 95 per cent. For information write Fairbanks, Morse & Co., Fairbanks-Morse Bldg., Chicago 5, Ill.

BUY MORE WAR BONDS

Fairbanks-Morse

A name worth remembering

Diesel Locomotives • Diesel Engines • Generators • Motors • Magnetos • Scales • Pumps • Stokers • Railway Motor Cars and Standpipes • Farm Equipment

gage instruments to greatly increase the application of the gage blocks are also available in the Metric system. Illustrated information on the set or instruments can be obtained from Continental Machines, Inc., 1301 Washington Avenue South, Minneapolis 4, Minnesota.

Frank M. Hawley Becomes Morse Chain Vice President and Director

APPOINTMENT of Frank M. Hawley as vice president and general manager, and his election to the board of directors, is announced by the directors of Morse Chain Company.

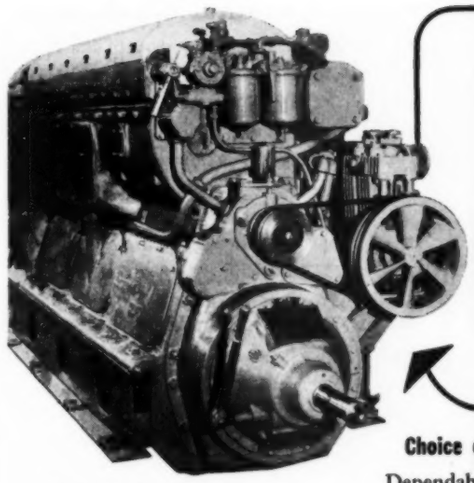
Frank M. Hawley

Mr. Hawley, formerly manager of the Detroit plant, has been associated with Morse Chain since 1919. He continues as a vice president of the company. He succeeds C. J. Kenerson, who retires as active head and continues as a director and vice president. Stanley B. Waring, former secretary, was elected secretary and treasurer. Announcement also was made that expansion costing upwards of one million dollars would be started at the Ithaca, N. Y., plant, anticipating substantially increased postwar demand for the company's products.

Fourth "E" Award To The Maxim Silencer Company

THE Maxim Silencer Company recently received the fourth star for its Army-Navy "E" flag. Receiving the original award in 1943, Maxim has now earned four stars, as the renewal award is normally made each six months until a company achieves four stars on the flag.

In commenting on the award, H. H. Maxim, President of the company, said "We are all proud to see the fourth star on our Army-Navy pennant. When we received the original award in 1943, I said that we were determined to keep up our production record. The people in our plant are still at it because they know the war isn't over."



HENDY Series 20 MARINE DIESEL ENGINE Equipped with QUINCY COMPRESSOR

Quincy COMPRESSORS for diesel starting

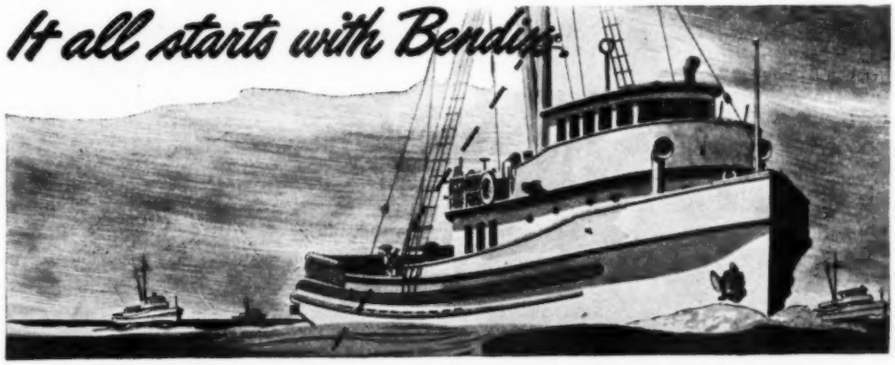
Choice of Leading Diesel Engine Manufacturers

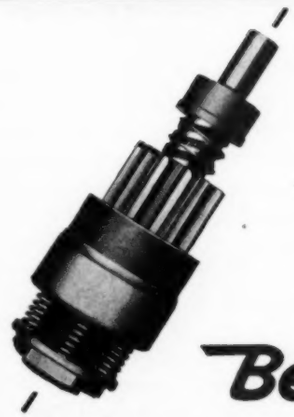
Dependability and compactness are compressor "musts" when Diesel engines are started by air power. Quincy offers a line of advanced design air compressors that are easily installed as an integral part of Diesel equipment. They can be relied upon for dependable starting power over a long, trouble-free service life.

Sizes available from 1 to 80 cu. ft. displacement. Pressures up to 500 lbs. p.s.i. A Quincy compressed air specialist is ready to serve you. Ask him about your air problems.

QUINCY COMPRESSOR CO.
Quincy, Illinois
Branch Offices: New York • Chicago • St. Louis • San Francisco

It all starts with Bendix.





Out of touch with land for months at a time, Diesel-powered commercial fishing craft must be "dead sure" of continuous dependable starting.

—and Bendix Starter Drives provide just that.*

Designed and engineered for compactness, ruggedness, universal adaptability, and simplicity of operation, these heavy-duty Drives have a performance-proven record of many years of dependable service on land and sea.

For heavy-duty Starting—marine, automotive and industrial—Bendix is best.

*REG. U. S. PAT. OFF.

Bendix Drive
ECLIPSE MACHINE DIVISION
ELMIRA, NEW YORK

PRODUCT OF Bendix AVIATION CORPORATION

USE HEADED AND THREADED FASTENERS FOR ECONOMY AND RELIABILITY

Alloy Steel
BOLTS · NUTS
STUDS

Every standard alloy steel fabricated into bolts, nuts, studs and many special fastenings. Accurately made in standard dimensions or to meet your specifications.

"THE BOLT MAN"

BETTER BOLTS SINCE 1882
A full line in carbon steel, heat-treated alloy steels, stainless steel, silicon bronze, brass, bronze, and monel metal.

PAWTUCKET
MANUFACTURING COMPANY
327 Pine Street • Pawtucket, R. I.
THE PLACE TO SOLVE YOUR BOLT PROBLEMS

Detroit Lubricator Appointments

C. H. HODGES, Jr., President of the Detroit Lubricator Company, announces the appointments, effective May 1, 1945, of E. J. Doucet, General Sales Manager, to Vice-President and General Manager Sales, with headquarters at Detroit; and K. B. Thorndike, Manager, Western Regional Office, to Vice-President, Western Regional Office, with headquarters in Chicago.

Worthington Names H. J. Schorle Works Manager

HERMAN J. SCHORLE has been named works manager of the Holyoke Works of Worthington Pump and Machinery Corporation. He succeeds Harry A. Feldbush, who has assumed administrative duties at the Corporation's General Offices in Harrison, N. J. Schorle was former executive engineer at Holyoke and Assistant Works Manager.

Herman J. Schorle

Assisting him is Willard A. Emery, former superintendent of all welding operations when Holyoke was producing 90 mm. anti-aircraft guns and Navy 5 in. dual purpose guns.

New Booklet On Steel Forgings

"HOW long is it since you visited a modern forge plant?" That is the challenging thought expressed at the start of the new booklet being presented to users of heavy duty steel forgings by the National Forge & Ordnance Company. And this thought of going through a forging plant keynotes the entire contents of the book, which is planned to bring the highpoints of such a trip to the reader who does not have the time or opportunity to visit the plant in person.

The basic operations of making a finished steel forging, as carried on at National Forge, are covered with a great deal of pictorial emphasis.

TO KEEP OIL CLEANER, LONGER

WGB Clarofiers are adopted by manufacturers, specified for fleets. Leading builders of gas and Diesel engines install WGB Clarofiers as standard equipment . . . and countless cost-wise fleet operators have specified them for their vehicles. Check their three reasons. (1) They keep lubricating oil amber-clear for longer periods. (2) WGB replacement cartridges are inexpensive, and can easily be installed, without tools. (3) WGB Clarofiers are sturdy, simple, trouble-free—built for heavy-duty jobs. Specify WGB Oil Clarofiers for substantial savings in maintenance and operating costs.

Send for your free copy of book describing WGB oil clarofying at work in gas and Diesel engines.

WGB
OIL CLARIFIER, INC.
KINGSTON, N. Y.

The many "on the spot" photographs which illustrate the entire book give one the feeling of being within the large National Forge plant, for they parallel the progress of a forging from the making of the electric steel through the forgesmithing and heat treating to the finish machining.

The facts that naturally go with such pictures are presented in a forthright, unadorned manner which makes the book all the more helpful to buyers and users of steel forgings. To obtain a free copy, simply address the National Forge & Ordnance Company, Irvine, Warren County, Pennsylvania and mention this magazine.

Tube Turns Forms New Division

CARL B. McLAUGHLIN will head up the recently established Engineering Service Division of Tube Turns, Inc., it is announced by John G. Seiler, the firm's Vice President in charge of sales. The division is rapidly developing new applications for Tube-Turn welding fittings.

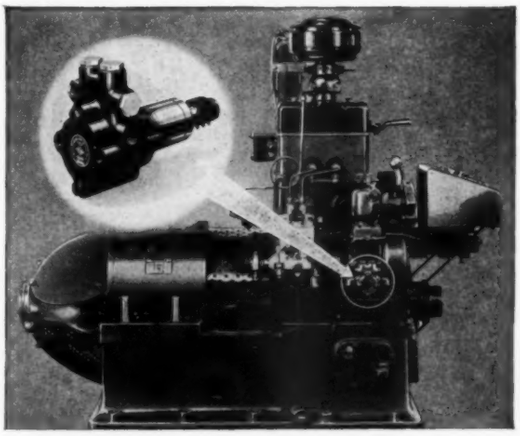
Carl B. McLaughlin

McLaughlin formerly was associated with Tube Turns' Pittsburgh office. A native of Jacksonville, Ill., he graduated from the University of Illinois in 1931 and was a metallurgist-engineer with the U. S. Steel Corp. before joining Tube Turns in 1943.

Bunting Brass & Bronze Elects R. R. Hirsch Vice President In Charge of Sales

ROBERT R. HIRSCH was made Vice President in Charge of Sales at a meeting of the directors of The Bunting Brass & Bronze Company of Toledo, Ohio on June 5. Mr. Hirsch joined the Bunting organization in January 1944 as Sales Director. He is a recognized authority on bearings and bearing applications and widely known among engineers and designers of machinery.

"SPECIFY EDCO ROTARY PUMPS"



EDCO

ENGINE DRIVEN FUEL TRANSFER PUMPS.

Noiseless in operation • Economical to operate and maintain • Pumping action equally effective at all operating speeds, because of unique and positive method of positioning rotor vanes to maintain effective seal. Capacities up to 15 gal. per min.

Engineering services and descriptive literature on request.

EDDINGTON METAL SPECIALTY COMPANY

Eddington Pa., U. S. A.

NEW
QUILL TYPE
GENERATORS
AC and DC
THIS new generator designed to reduce overall length and weight of the entire unit, where compactness is a "must". It eliminates use of ball bearings in generator. The armature mounts directly on the shaft extension of the engine, and the frame is bolted directly to the engine crankcase. Made in AC and DC—1800, 2600 and 3600 RPM in ratings of 850, 1000, 1500, 2000 and 3000 watts. Complete engineering data upon request.
Cutaway view of AC quill type generator showing unique construction details . . . note absence of bearings and end brackets.
AC-DC GENERATORS
KURZ and ROOT Company
Since 1898
APPLETON · WISCONSIN
. . . . . and DC motors and motor generator sets

McCORD
Class S.F.
LUBRICATORS
A modern lubricator for modern service on Diesel, gas, steam engines and' compressors. Supplies dependable cylinder lubrication in metered quantities reducing friction and wear. Capacities: 2 to 24 pt. and 1 to 16 feeds. New catalog on request.
RESULT OF 40 YEARS' LUBRICATOR BUILDING EXPERIENCE
McCORD RADIATOR & MFG. CO. DETROIT, MICHIGAN LUBRICATOR DIVISION

Candler-Hill Appoints Vice President

THOMAS B. WRIGHT, president of Candler-Hill Corporation, a division of Titan Pump and Engineering Corporation, has just announced the appointment of Joe Miller as a vice president. He will be associated with both the engineering and production departments.

Joe Miller

Miller is well qualified for his new duties, having just left the Diesel Engine Division of General Motors Corporation after ten years service. He is a graduate of the University of Michigan in the class of 1928 and is a member of the Society of Automotive Engineers. His experience and knowledge have earned him a high place among U. S. Diesel engineers.

OAKITE SHORT CUTS FOR Diesel OPERATORS

Keep Diesels Looking Spick and Span

Wipe painted surfaces with a solution of Oakite Renovator. It's your best bet for keeping Diesels, generators, motors and other plant equipment always spruced up. Oakite Renovator safely removes oil, grease, dirt and finger marks. You will find it particularly effective in restoring painted surfaces to their original, new-looking, glossy appearance.

Complete details in our 20-page Digest describe 71 different jobs on which Oakite materials and methods successfully aid in conserving labor . . . keeping maintenance costs low. Write for your free copy TODAY!

OAKITE PRODUCTS, INC.
22D Thames Street, New York 6, N.Y.
Technical Service Representatives Located in All Principal Cities of the United States and Canada

OAKITE Specialized CLEANING
MATERIALS & METHODS FOR EVERY CLEANING REQUIREMENT

Generating Units
5 K.W. to 100 K.W. A.C. or D.C.

Close regulation of voltage and frequency is an outstanding feature of the generating units we build with either Diesel or gasoline prime movers. We are also equipped to supply any type of instrument panel required.

Manufacturers of engine generator sets for over 20 years.

Duplex Diesel-electric generating unit 1200 RPM, 15 KW

Duplex Truck Co.
Lansing, Michigan

Fifth Award Of Merit To Paxton-Mitchell Co.

IN a ceremony at the plant May 22, under the sponsorship of the labor-management war production drive committee, employees of Paxton-Mitchell Company, Omaha, Nebraska received their fifth Maritime Commission award of merit for continued outstanding war production.

The award, conferred by Admiral Howard L. Vickery, U. S. Maritime Commission, in a letter to James L. Paxton, Jr., president of the company, was presented by Lt. C. J. McGrew, USNR. Merit badges for the newer employees were presented by Capt. Fred G. Arkoosh, U. S. Army Ordnance. This is the fifth gold star to be affixed on the "M" pennant received March 19, 1943, for the production of parts for Liberty ships. The company is now producing repair and replacement parts for Victory and Liberty ships and other equipment for the army and navy.

Highest Quality Gaskets & Oil Seals by FITZGERALD

Gasket Craftsmen for 39 Years

Gaskets of all types and materials to give reliable service under all Diesel operating conditions.

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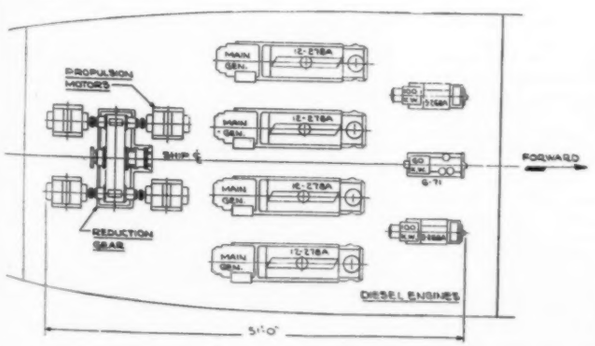
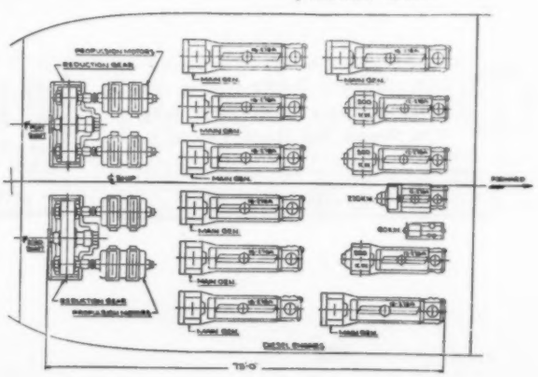


Diagrammatic arrangement of power units for 4000 shp. direct current drive.

Arrangement of power units for 12,000 shp. direct current drive.



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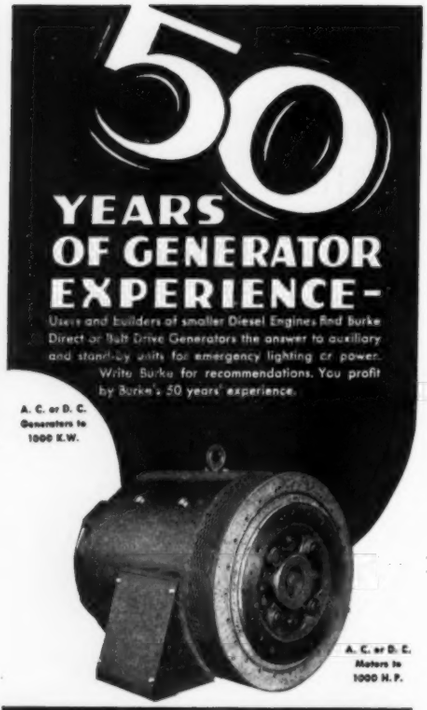
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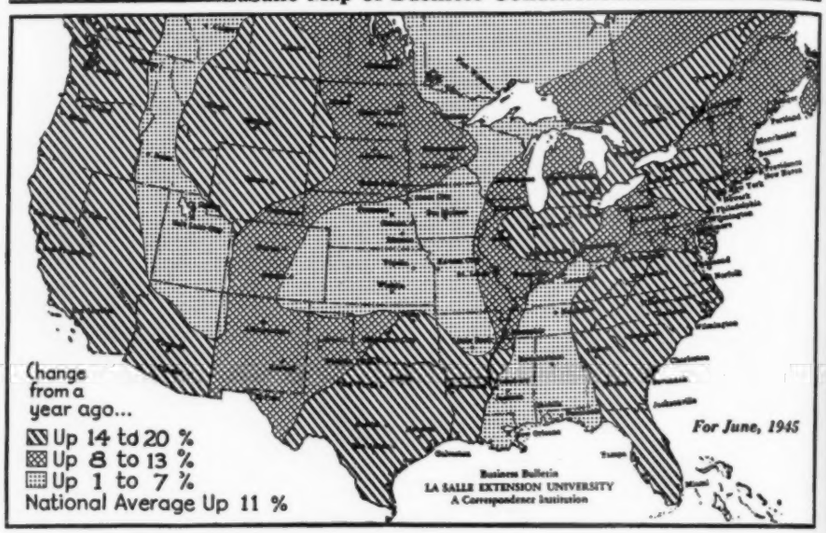
LaSalle Map of Business Conditions


Change from a year ago...
Up 14 to 20 %
Up 8 to 13 %
Up 1 to 7 %
National Average Up 11 %
For June, 1945
Business Bulletin
LA SALLE EXTENSION UNIVERSITY
A Correspondence Institution

Areas of Good Business Include Most of Country

Map Supplied by BUSINESS BULLETIN DIVISION of La Salle

While many readjustments are being made following the end of the war in Europe, the volume of trade and industry is holding up well in nearly all parts of the country. Business activity averages about 11 per cent higher than last year and in every section is above even the high level of a year ago. In a number of communities where war plants are being discontinued or war contracts have been cancelled, activity has dropped sharply but these areas have not been widespread enough to change the general average.

Variations among different sections are likely to become more evident during the next few months, but no significant signs of any sharp decline in the near future have yet appeared. The current outlook is for a continuation of very close to the present high rate indefinitely. Trends will continue to be geared very closely to the demands for war materials and equipment.

Differences among the various sections of the country are somewhat less now than they have been in recent months. Several of those shown on the LaSalle Map are due more to the conditions last year than they are to current trends. In spite of many shifts that are being made, business is about as stable as it has been for some time and, unless the Pacific War should take unexpected turns, this stability will continue into the third quarter of the year.

Gains over last year have been greatest in the Pacific Coast region, and that trend may become even more marked as both materials and equipment are sent westward for the war in Asia. Around the Great Lakes, war plants are still operating at close to capacity even though a large number of contracts have been cancelled. Business is still holding up well in the East although some slackening may be expected in that section as smaller amounts of war materials will be sent to Europe. Much of this reduction may be offset by increased shipments of food which will be needed in Europe this summer until this year's crops are harvested. Reconversion to civilian production in many plants may also help to keep up business volume. That trend is already evident in the New England states where conditions have become a little better during the last month.

Business is lagging in parts of the agricultural region of the Middle West. Some of the falling off has been due to transportation difficulties as cars have not been available to ship as large quantities of grains and livestock as were shipped last year. The situation is becoming better, however, and some improvement is likely to be evident in the LaSalle Map next month.

Another area of lagging business is the Mountain States, where mining and related activities have changed but little during the last few months. An exception is the oil production regions, although even here the volume of business has not risen quite so rapidly as would be indicated by the large increases in the output of crude oil. Activity in many places is about the same as the national average.

In Canada, the most striking improvements continue to be in the industrial region north of the Great Lakes. Business is also good in the West where shipments abroad have been considerably speeded up. Factory output is about the same as it was a year ago and consumer incomes are high. These, together with continued large war expenditures, keep the volume of business high. Conditions in the agricultural regions have remained fairly stable, and the crop outlook is quite favorable. The general trade of trade and industry is expected to remain close to present levels during the next few months.

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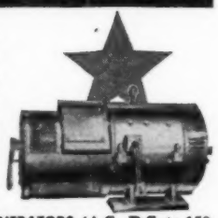

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Gould Division Appoints Sales Manager

EFFECTIVE May 1, 1945, Richard H. Rowland, Vice President in Charge of the National Battery Company's Gould Industrial Division, Depew, New York, will assume the added responsibility of General Sales Manager, succeeding John C. Sykora, resigned, according to an announcement issued by A. H. Daggett, National Battery president.

Richard H. Rowland

Mr. Rowland, a Michigan alumnus, was vice president of the St. Paul Engineering & Manufacturing Company prior to his recent connection with the National Battery Company. In addition to his general administrative responsibilities, he will direct the operations of Gould's entire sales and service field organization. Mr. Sykora, whose resignation terminates twenty-six years of Gould service, has been appointed Director of Sales, Portable Products Company, New York. At the time of his resignation, he was Gould Vice President in Charge of Sales.

DIESEL PROGRESS Editorial Index

A COMPLETE index of all editorial material which appeared in the 1944 issues of DIESEL PROGRESS is now available. Included is a cross index of authors and articles. Feature articles are covered by title; news notes are indexed by names of manufacturers. No charge for this index. Address requests to DIESEL PROGRESS, 2 West 45th Street, New York 19.

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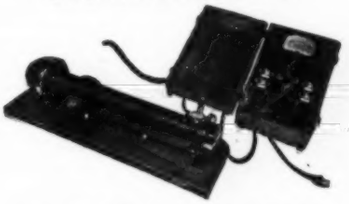

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Mack Promotes Ewell To Southern Manager Post

APPOINTMENT of Elliott G. Ewell as vice president and manager of Mack's Southern Division has been announced by A. C. Fetzer, vice president of Mack-International Motor Truck Corp. Mr. Ewell, who has been with the firm since 1924, will make his headquarters at 730 Peachtree St. in Atlanta, Ga.

Elliott G. Ewell

Mr. Ewell joined the Mack organization 21 years ago as a salesman in the Charlotte, N. C., branch. He remained in the branch and in 1939 was named manager in Charlotte, which post he retained until his present appointment. His place in Charlotte will be taken by L. D. Marshburn who has been appointed branch manager.

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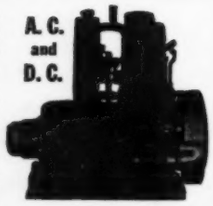

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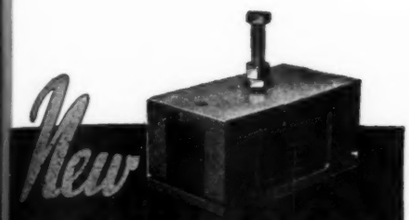

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IN the Spring of 1943 John Reiner & Company, Long Island City, N. Y., was awarded the Army-Navy "E" flag. Recently, a third star was added to the other two won for continuing excellent work in designing and building "built to order" Diesel Power Units and Diesel Generating Sets so widely used in connection with the war effort.

West Coast Diesel News

By JIM MEDFORD

A 175 hp. Gray marine Diesel is now repowering the 65 ft. tug *C. B. Smith* of Gig Harbor, Washington, with its new Coolidge wheel.

COMPLETED at the San Francisco, California, yard of the Martinolich Shipbuilding Co., the 96-ft. tuna clipper *Titanic* for John Gradis is powered with a 600 hp. Elliott-Buchi turbocharged Diesel. Auxiliaries are 100 hp. Caterpillar and 160 hp. Buda Diesels.

THE Sacramento River tug owned by Capt. Ed. Hoffman, San Francisco, California, has been repowered with a 125 hp. Caterpillar Diesel giving the 45-ft. craft 10 mph. with tow.

IN frame at the San Diego (California) Marine Construction Co.'s yard is the new 90-ft. tuna vessel *Prospect*. Main engine will be a 320 hp. Atlas Imperial Diesel with auxiliaries of the same make; wheel by Lambie.

HARBOR Boatyards, Ltd., Coal Harbor, B. C., have completed the 79-ft. troller for the Kyuquot Trollers Association. The main engine is a 200 hp. Atlas Imperial marine Diesel.

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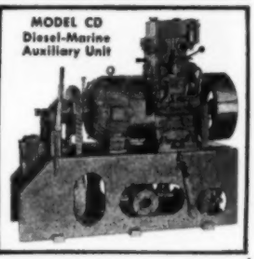

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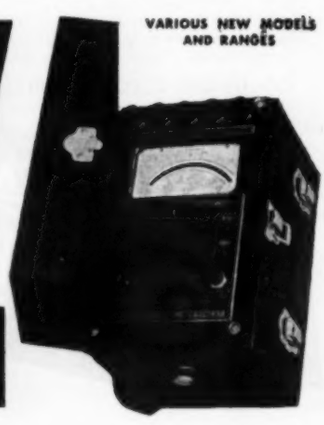

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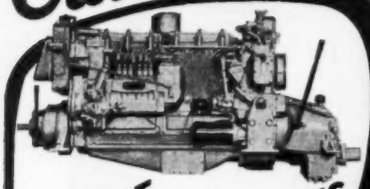

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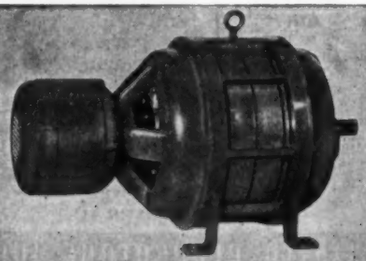

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